IS **SILICON VALLEY** BAD FOR YOUR HEALTH? p. 154
By Jeffrey M. O'Brien

FORTUNE

Issue: November 1, 2015
Fortune.com

Every aspect of your business is about *to change.*

By Geoff Colvin
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THE 21ST CENTURY CORPORATION AND WHAT YOU NEED TO KNOW NOW

Uber's Tax Scheme p. 114
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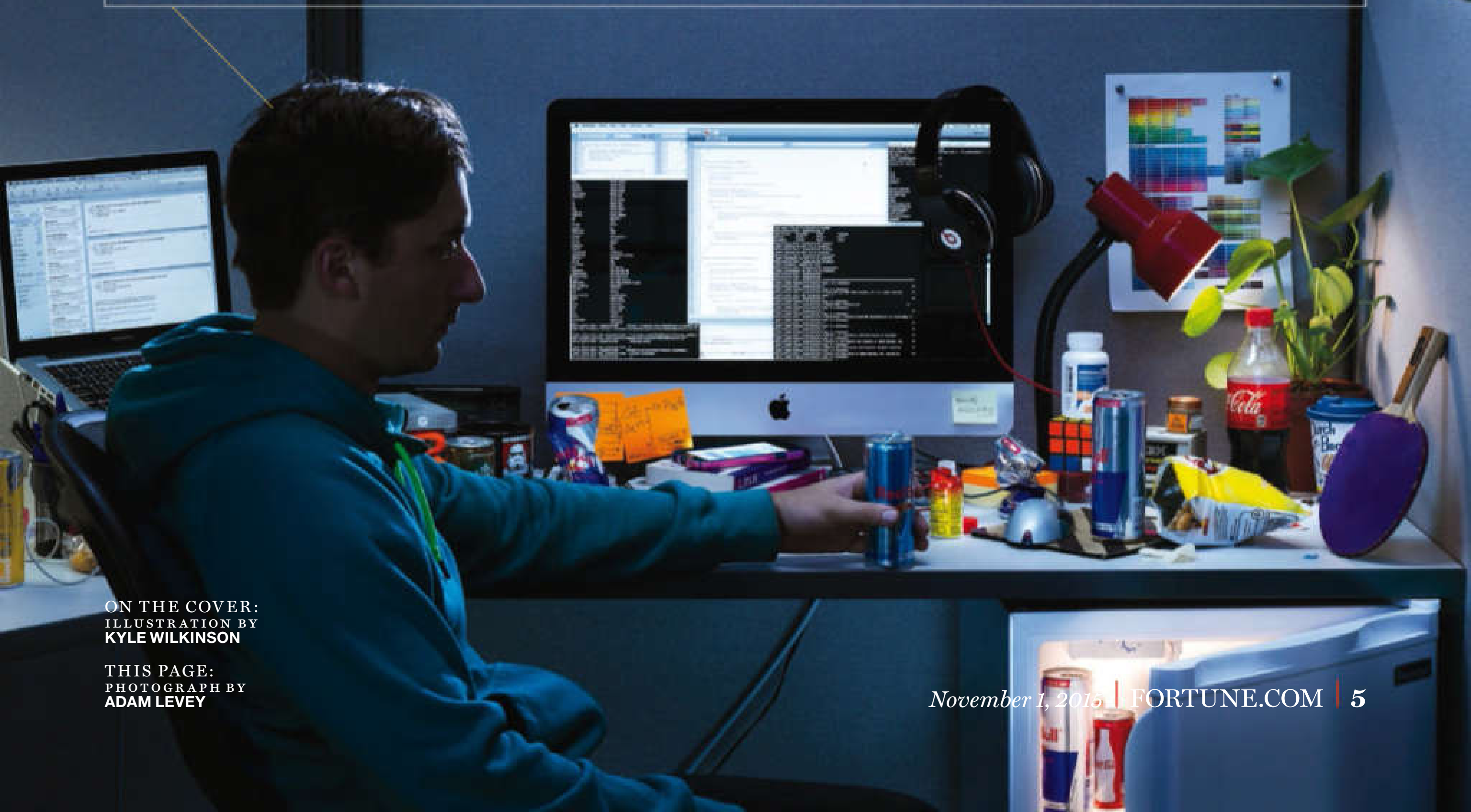
features



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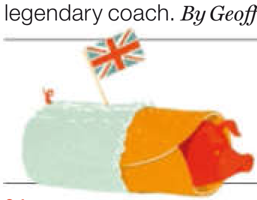
From left: Megyn Kelly, Ginni Rometty, and Michelle Obama



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The 21st-Century Club

IN HONG KONG earlier this fall, I was asked to participate in a debate titled "Whose Century Is It Anyway?" The discussion keyed off of *Fortune* founder Henry Luce's declaration of "the American Century" in 1941, and predicted an Asian Century by 2041.

At *Fortune* we certainly understand the economic forces fueling such predictions. Our Global 500, which ranks companies by revenue, has seen the number of Chinese companies on the list swell to 98 from just 10 at the turn of the century, while U.S. companies have fallen to 128 from 179. Even a modest continuation of that trend would catapult Asia to dominance in the next decade.

But size is not the only metric that matters. Tiny England ruled the 19th century because its ingenuity created the steam engine, the power loom, and the first Industrial Revolution. The U.S. took the lead in the 20th, building giant companies—the original *Fortune* 500—that mastered mass production and managerial capitalism.

We are now in the early stages of a third Industrial Revolution, with an entirely different economic logic that is causing fundamental changes in the structure of business. The marketplace friction that Nobel economist Ronald Coase cited as justification for giant companies in the last century is melting away. In its place a new model is emerging in which everyone and everything are connected, everywhere and all the time, in a vast web of interactive data that is creating an economic dynamic characterized by zero marginal costs, massive returns to scale, and platform economics. New corporate behemoths like Google, Facebook, and Uber are reaching *Fortune* 500 size at unprecedented speed. The century will belong to those who master this new model. Economic dynamism will matter more than sheer scale.

This new Industrial Revolution will be the focus of the 13th *Fortune* Global Forum, being held in San Francisco in November. The invitation-only CEO gathering will include leaders of many of the largest companies in the world and focus on the challenge of "Winning in the Disruptive Century."

Innovation, of course, is critical to this economic transition. And when it comes to innovation, the San Francisco area provides fertile ground. But innovation ultimately knows no boundaries. Many Asian-born engineers and entrepreneurs play a large role in the success of Silicon Valley. And Asian companies like Samsung, Xiaomi, and Huawei are making innovative strides every day.

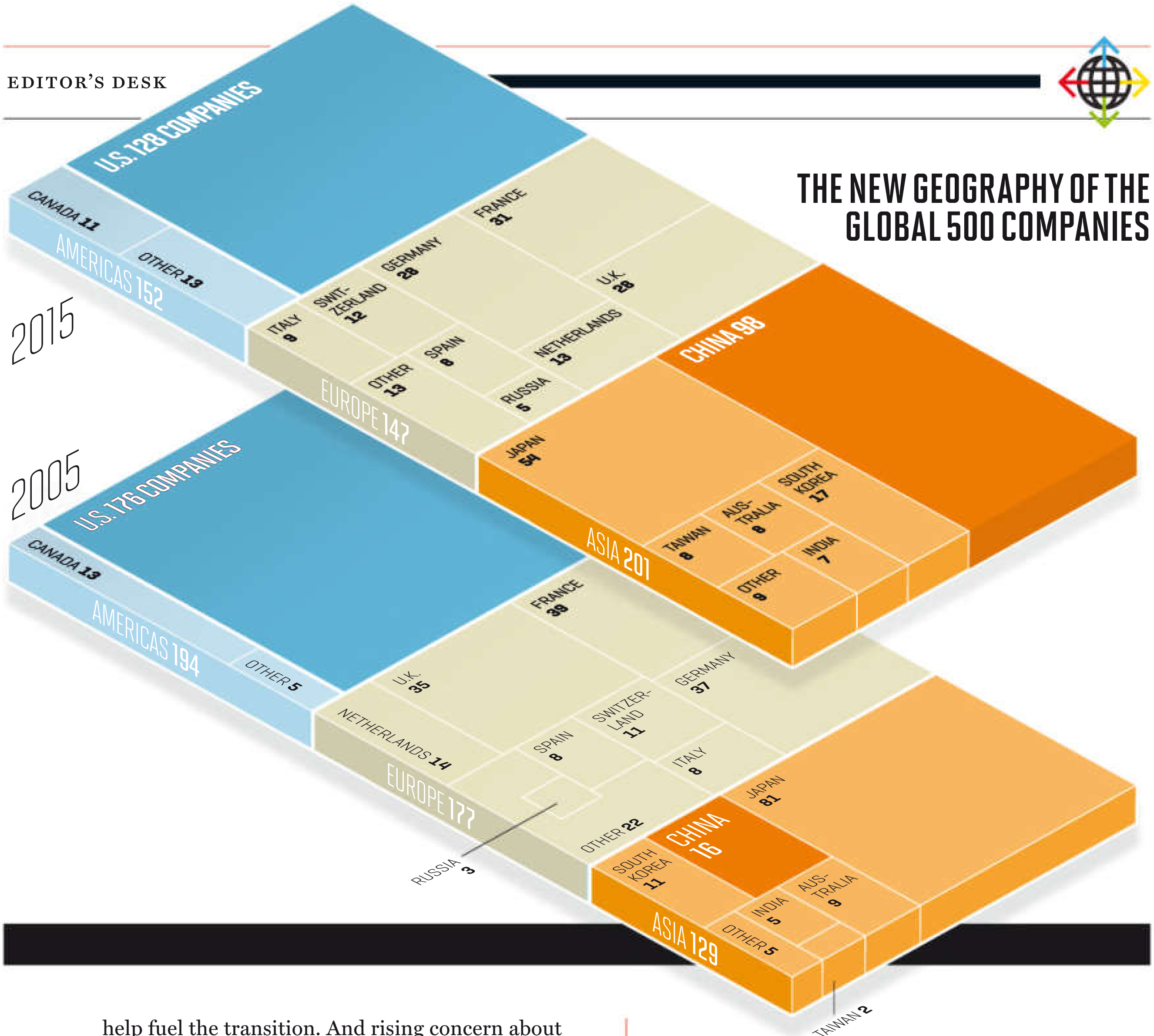
Beyond innovation, the question for the 21st century is, Who will allow the social and economic disruption that innovation brings? We are at a Schumpeterian moment, when creative destruction threatens to clear away the business world we are familiar with to make way for one we aren't. The 21st century will belong to those who embrace that disruption rather than fight it.

In the U.S., business leaders have learned the language of change. When IBM's Ginni Rometty tells her managers to "always disrupt yourself" or Dow Chemical's Andrew Liveris talks of four reinventions in 10 years, they are signaling that they recognize the need for rapid and profound change. America's business leaders hear the footsteps of history rushing behind them. They know they must disrupt themselves, or be disrupted.

The U.S. political system seems less ready for the revolution. While celebrating the personal freedom that allows innovation and disruption to flourish, the political tide has turned against policies like free trade and more expansive immigration that could

PHOTOGRAPH BY **WESLEY MANN**

THE NEW GEOGRAPHY OF THE GLOBAL 500 COMPANIES



help fuel the transition. And rising concern about inequality has caused an antibusiness backlash that could give birth to new policies that become significant obstacles to change.

But that still leaves the U.S. ahead of China, where disruption has long been the declared enemy of the state. The top 12 companies on the *Fortune* Global 500 list are state-owned enterprises, with leadership chosen by the government and favored access to capital. There is no sign they hear footsteps at their heels. Even if innovation flourishes in China, creative destruction seems unlikely under the current regime. There may be private companies that take their home-grown strengths and use them to succeed elsewhere in the world. But as long as the home market is protected, disruption will surely lag.

Debating whether the 21st century belongs to Asia or America, however, ultimately misses a key point. The successful corporations of the future will be those that not only embrace the profound changes of today's technologies but also build their businesses on a truly global scale. The first and second Industrial Revolutions showered riches on a relatively small group of people in the U.S., Europe, and Japan. The third Industrial Revolution will cover the globe, creating a new, connected middle class that will include the bulk of humanity.

All these themes will be explored when we meet in San Francisco the first week of November. We will look at Google's unique approach to management in a rare one-on-one interview with Alphabet (it still feels funny to write that) CEO Larry Page. We will hear from top leaders in finance, including J.P. Morgan CEO Jamie Dimon and Wells Fargo CEO


THIS CONE HELD A BUSINESS HOSTAGE.
When a cone stopped delivery trucks from entering a West Coast port during a strike, cosmetics business Juice Beauty had a serious problem. With their packaging stranded overseas, the company's owner had to act fast. Thankfully, with a complete view of her finances from Chase for Business, she could manage her cash flow and air-ship her packaging in time to meet a critical holiday order.
This cone is one of the thousands of things a business cannot control. Learn how Chase for Business helped Juice Beauty control their finances at Chase.com/forBusiness.
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Fortune's Geoff Colvin (standing) puts the tough questions to (from left) CEOs Yuanqing Yang of Lenovo Group, Coca-Cola's Muhtar Kent, and Jamie Dimon of J.P. Morgan Chase at the most recent *Fortune* Global Forum, in Chengdu, China.

John Stumpf; in technology, including IBM CEO Ginni Rometty, Lenovo CEO Yuanqing Yang, Cisco chairman John Chambers, Salesforce CEO Marc Benioff, and BT CEO Gavin Patterson; in health care, including United Therapeutics CEO Martine Rothblatt, Aetna CEO Mark Bertolini, and Kaiser Permanente CEO Bernard Tyson; in food, including Campbell Soup CEO Denise Morrison and Monsanto CEO Hugh Grant; in media, including Comcast CEO Brian Roberts, Yahoo CEO Marissa Mayer, and Facebook COO Sheryl Sandberg; and in heavy industry, including Siemens CEO Joe Kaeser and Lockheed CEO Marillyn Hewson.

Convening this year's forum in Silicon Valley is no accident. We will mix the leaders of established companies with leading entrepreneurs, thinkers, and venture capitalists, including Marc Andreessen, Warby Parker co-founder David Gilboa, Uber co-founder Garrett Camp, Airbnb founder Brian Chesky, and Facebook's Sandberg. (Lest anyone think that Northern California has all the answers, we explore one dark side of high-tech culture in this issue: See "Is Silicon Valley Bad for Your Health?" on page 154.) While attendance at the *Fortune* Global Forum is by invitation, the insights and news shared there will be available to anyone: The proceedings will be webcast and covered heavily on Fortune.com.

The pace and geography of the changes in business will continue to be a matter for debate and speculation. But the inevitability of that change has been settled by history. The new technologies of business have their own irresistible logic. The 21st-century corporation is coming. We at *Fortune* are doing our best to help light the way.

ALAN MURRAY
Editor
@alansmurray

PHOTOGRAPH BY STEFEN CHOW—*FORTUNE* GLOBAL FORUM


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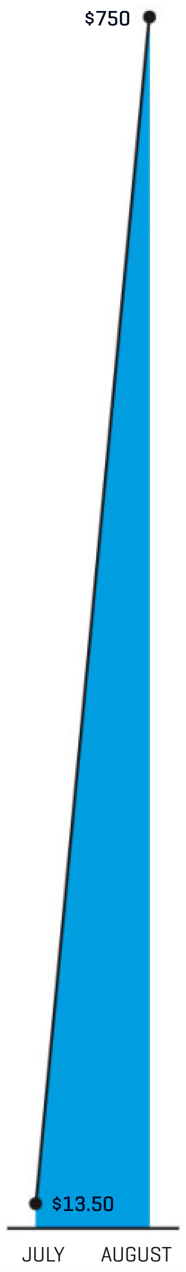
CLOSER LOOK



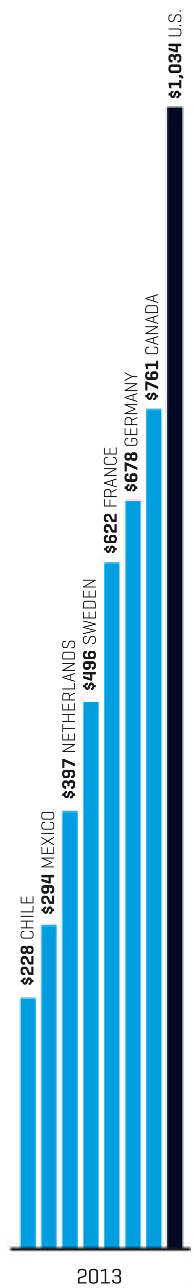
COST OF ONE DARAPRIM PILL IN 2015

GRAPHIC SOURCE: OECD

The U.S. Has the Highest Drug Prices in the World. And Hating Martin Shkreli Won't Be Enough to Change It.

By Laura Lorenzetti

A little-known drug called Daraprim captured national attention in September when Turing Pharmaceuticals boosted the price of the lifesaving toxoplasmosis treatment by over 5,000%. Overnight, Turing CEO Martin Shkreli became the poster child for bad business in the pharmaceutical industry, skewered for what was seen as price gouging, leaving very ill patients without treatment. ¶ Turing became a tipping point that drew scrutiny from all spheres—patients, doctors, advocates—and made drugmakers a prime target of politicians. Presidential candidate Hillary Clinton weighed in with her own proposal to cap drug prices, sending biotech stocks plummeting, and federal authorities targeted Valeant Pharmaceuticals with a subpoena demanding more information on its drug pricing strategies. ¶ But despite the uproar, high prescription drug prices in the U.S. are nothing new. The costs of specialty cancer drugs have increased an average of 10% annually since 1995, according to one recent study. Last year alone, brand-



ANNUAL PER CAPITA EXPENDITURE ON DRUGS

(IN U.S. DOLLARS, ADJUSTED FOR PURCHASING-POWER PARITY)

name drug prices rose by 14.8%, says analytics firm Truveris. Price hikes are so routine, in the U.S. in particular, that Credit Suisse estimates they accounted for 80% of profits last year for the largest drug companies.

This doesn't happen everywhere. In most European countries, single-payer health systems use their size to negotiate big discounts. In the U.S., though, benefits managers and insurers are left to haggle on their own, and Medicare, the single largest payer for health care in the U.S., is barred by law from negotiating directly with drug companies. The result is that the U.S. is a drugmakers' gold mine. According to the latest available data, U.S. drug spending in 2012 totaled $328 billion, more than twice that of France, Germany, Italy, Spain, and Britain combined.

Could intensifying political pressure finally force a change? The prognosis isn't good. Democrats have been trying to amend Medicare's non-negotiating rule since long before Clinton released her proposal, but so far they've been unable to even bring the debate to the floor. Evercore ISI political analyst Terry Haines thinks the chances of forcing a bill through Congress are nil. "The solution is a lot harder than it looks," Haines says.

In October, after overwhelming blowback, Shkreli agreed to reduce the price of Daraprim but has yet to say by how much or when. Don't expect the rest of the industry to move much faster.

LESS GREEN THAN IT LOOKS

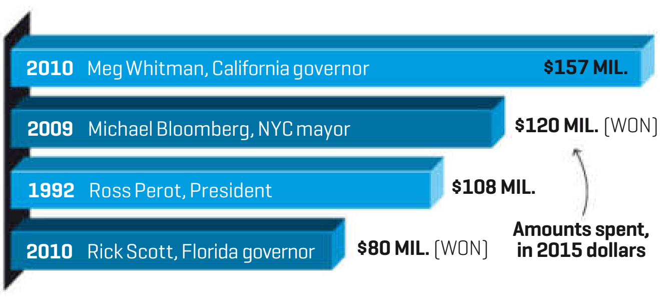
VW FOOLED EVERYONE. WAS IT THE ONLY ONE?

IN EARLY SEPTEMBER the Dow Jones Sustainability Index (DJSI) crowned Volkswagen the world's most sustainable car company. The German automaker put out a press release celebrating its "full marks" on "codes of conduct, compliance, and anti-corruption, as well as innovation management [and] climate strategy." Just 10 days later, of course, it issued an apology for what turned out to be a profound lack of all of the above.

How did an emissions cheat land atop the world's longest-running and, per Rate the Raters, most credible of corporate sustainability indexes? Or for that matter, lead BCG's Brand Advocacy Index? Or fool everyone, from the EPA to the earth-loving Jetta driver, into thinking that VW was a car company as clean and green as they come?

Mostly by saying all the right things. Yes, VW rigged its software—but most sustainability evaluations rely on information companies themselves provide. "All of this data is still imperfect," says Chris Guenther, research director at SustainAbility, which runs the Rate the Raters survey. "It can be gamed—especially if you're willfully gaming it."

Efforts to fix that are already underway, from upgrades to emissions-testing methods in the U.S. and Europe to process review at RobecoSAM, the firm that crunches numbers for the DJSI. If it's successful, VW may not be the last to get caught gaming the system. Says Guenther: "This will reverberate for a long time." —*Erika Fry*



TRUMP CHANGE

WHAT SELF-FUNDERS SPEND

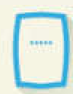
Donald Trump's presidential campaign has so far spent about $5 million and announced plans to spend $20 million more. That's vanishingly small compared with what other wealthy candidates have shelled out in the past. If Trump is serious about his run, he may have to reach deeper into that "yuge" wallet. —*TORY NEWMYER*

POORLY KEPT SECRETS

AUSTRALIA: TEST KITCHEN TO THE WORLD

When McDonald's and KFC wanted to try out new hipster-friendly quinoa-selling restaurant concepts, they first tested the ideas in Australia. They're not the first. Citigroup is using the country as a proving ground for digital banking tools, AOL for ad products, and Coke for packaging. It's also a top country for new gaming apps, says German firm Priori Data, with 350 daily launches. What makes the land Down Under such an appealing lab? BCG's Michael Silverstein says the continent's educated, affluent population of just 23.7 million is open to new products and makes a "good proxy for white, Christian America." And its isolation doesn't hurt: If a product flops in the outback and no one hears about it, did it really happen? —*E.F.*

FIRST LAUNCHED IN AUSTRALIA



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FARMVILLE 2

AUSTRALIA, NEW ZEALAND, THE U.K., AND CANADA ARE ALL POPULAR TEST MARKETS FOR NEW GAMES.

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CHANGING COURSE

WHY BIG BUSINESS LOVES MARATHONS

By Phil Wahba

O**VER THE PAST** two decades the act of voluntarily running long distances has gone from a curious hobby for a few fitness addicts to a full-fledged national phenomenon. Last year 18.75 million Americans finished a road race, and 550,637 finished a marathon, an all-time high, according to trade group Running USA, up from 25,000 in 1976. There were 1,200 marathons in 2014, four times the number in 2000. And half marathons and 5K races have grown even faster.

Now, as the distance-running season reaches its fall peak, the sport is looking more corporate than ever. IBISWorld estimates organized road racing to be a $1.4-billion-and-growing industry (shoe sales not included), as race organizers and sponsors alike increasingly clamor for a piece of the growing world of participatory sports.

Even Richard Branson is in on it. Earlier this year the billionaire entrepreneur recruited Mary Wittenberg, former head of New York Road Runners, the nonprofit organizer of the biggest marathon in the world, to lead Virgin Sport, a new venture that will put on mass sporting events, including road races. Virgin will join the already established Competitor Group, which is expanding its Rock 'n' Roll road-running series. Competitor was bought by private equity firm Calera Capital for a reported $250 million in 2012, with $116 million in revenue. It held its first New York City race in Brooklyn this fall.

More proof that private corporations are seeking a runner's high? In August, Providence Equity Partners sold the Ironman series of triathlons to China's Dalian Wanda Group for $650 million, reportedly making four times its initial investment.

For sponsors, running holds unique appeal. Rich Harshbarger, CEO of Running USA, says marathoners—dedicated by nature—make particularly loyal customers for the brands that prop up their sport. "Runners understand the sponsors' support," he says. And the demographics don't hurt: The median household income of a runner is $112,000, and at least

PowerBar was one of dozens of sponsors for the Bank of America Chicago Marathon in October.

79% are college educated.

Yet distance-running participation isn't growing at the pace it once was, and at the moment most running events are too small to command the attention of big advertisers, particularly for one-off races. "It's really hard to get sponsorship against just one day," says Wittenberg. Sponsors want a circuit. That has led groups like Competitor to buy up existing midsize races of about 5,000 to 10,000 runners, with plans to rebrand them, use their logistical expertise to improve them, and start more of their own. That way, not only do race organizers benefit from economies of scale, but they can sell sponsorships in bulk.

Not everyone loves the streamlining, but the entrance of larger players may ultimately have a democratizing effect. More organizers are focusing on easier races like 5Ks, which are growing particularly quickly.

Of course, most races will still be small, volunteer-run affairs. On a crisp October morning, race director Dr. Mark Cucuzzella personally gave instructions to runners at Freedom's Run marathon, a 340-finisher race in West Virginia. It doesn't make much money, he says, but not everything has to.

OFF THE BEATEN TRACK

It's not just traditional racing that's booming. Extreme mass-participation sports now count thousands of annual participants.

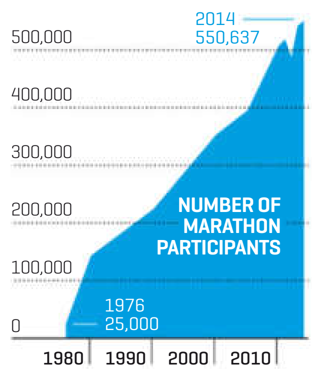
IRONMAN
THE COMPANY THAT PUTS ON THE IRONMAN TRIATHLONS WAS SOLD IN AUGUST FOR $650 MILLION.

TOUGH MUDDER
THE GRUELING 10- TO 12-MILE OBSTACLE-COURSE SERIES BROUGHT IN MORE THAN $100 MILLION LAST YEAR.

THE COLOR RUN
POWDER-COATED SPRINTS ARE NOW THE LARGEST 5K EVENT SERIES.

MORE MILES THAN EVER

The number of marathon finishers in the U.S. has increased more than 20-fold in 40 years. The only dip was when Superstorm Sandy shut down the New York race in 2012.



FORTUNE SENIOR WRITER PHIL WAHBA IS ON A QUEST TO RUN A MARATHON IN EVERY STATE. IN NOVEMBER HE'LL HIT NO. 24, IN OKLAHOMA, HIS 40TH MARATHON TO DATE.

PHOTOGRAPH BY SAVERIO TRUGLIA

MARATHON-FINISHERS CHART SOURCE: RUNNING USA; WAHBA: COURTESY OF PHIL WAHBA; ICONS: MARTIN LAKSMAN

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The New Math of Employee Accountability

Accounting offers a unique framework to consider employee accountability.

BY SHIDEH SEDGH BINA & NATHAN OWEN ROSENBERG SR.
ILLUSTRATION BY NEIL WEBB

Like a balance sheet reconciles assets with liabilities to give a picture of performance, someone who is truly being accountable reconciles actions and inaction with results—when they deliver the promised results, as well as when they do not.

Accounting is a system for keeping track of and reporting financial transactions. Everybody knows that. Accounting can be vastly complex, but at its core, it is a simple concept: a system of specific accounts to uniformly track income, expenses, assets and liabilities. Everybody knows that, too, right? While cash is fungible, the accounts are not.

But what about accounting, when it comes to performance? Not everyone would define that word the same way. And hardly any of us would associate accountability with financial accounting, even though you will see that they are very similar—not just etymologically, but mathematically.

Mostly, we think of accountability as an assignment of blame. If you are accountable, you take the blame for what goes wrong and credit for what goes right.

But, accountability is not blame nor credit. Effectively, employee accountability is a system for tracking work and accomplishment—just like accounting is a system for tracking money and assets. It is a way of weighing or reckoning behavior. Specifically, it is about owning a result and providing a reckoning of the actions taken—and the actions not taken—that led to the final outcome. Just like in accounting, where the balance sheet must add up correctly, there also has to be a balance in accountability.

The Economy Is No Excuse for Performance

Think of it this way: If a salesperson comes to a manager and says, "I didn't hit my sales goals because the recession is so bad and nobody is buying," that salesperson is giving a reckoning of the circumstances. And the circumstances are something the salesperson does not fully control. That conversation does not end well because almost all of us have a job to produce the intended results—not report on the circumstances.

In some companies, having a good excuse or reason is almost as good a delivering the intended result. In those weak organizations, the equations might look like: **A good story about the circumstances + no result = accountability.** But that just does not balance. The story doesn't give any access to improving performance in the future.

Results are a function of actions taken. Period. Any excuse, any story, any justification dilutes accountability and gets one further from the source of performance.

In practice, accountability is a salesperson (or any person hired to deliver an outcome) saying: "I delivered what I promised," or "I didn't deliver what I promised. These are the things I did that were effective. These are the things I did that were not effective. These are the places I didn't take enough action. And these are the things that I knew to do and didn't." Simple. Clean. Straightforward.

Insigniam also has an innovation equation for dramatic growth. To learn about it, visit insigniam.com/innovation.

Establishing Decision Rights

You cannot have accountability without ownership and clarity. Employees need to know exactly for what they are accountable, and they need to know exactly how their success will be measured.

Clarity and ownership often boil down to decision rights. Unfortunately, most organizations will not take the time to clearly establish a decision-rights process. Too often, this results in finger-pointing, people tripping over each other and decisions unnecessarily floating to the top of the organizational hierarchy. Worse still are bottlenecks, in which decisions are delayed or simply not made at all.

The next time you talk about accountability, ask the following questions:

- What is the purpose of your role?
- For what are others counting on you? How will you and they measure that?
- What decision rights do you require to deliver what you are promising?
- What decision do you need to be consulted on to deliver what you are promising?
- Where is alignment or support from others needed to execute specific decisions you make? Who needs your support or alignment for specific decisions made by them?

In truly high-performing organizations, each person knows the specific outcomes he or she is being held accountable for, and decisions rights reside at the levels of the organization where they make the biggest difference. Organizations that fail to establish a decision-rights system often find low reliability on timely execution with decisions left unmade or floating to the top of the organization. With decision rights clearly delineated accountability is more potently expressed and execution on key strategic outcomes, and even day-to-day operations, will dramatically improve.

The accountable person only talks about his or her actions and lack of actions. Much like how a balance sheet reconciles assets with liabilities to give a picture of performance, the person who is being accountable reconciles actions and inaction with results—when he or she delivers the promised results, as well as when he or she does not. The performance equation becomes: **Owning actions and inaction + result = accountability.** That is the right equation, one that a manager can do something with.

With this equation for accountability, the manager, and more importantly, the employee both know what went right and what went wrong. The manager can do something with that information, like help the person work to overcome ineffective behavior and leverage the actions that were effective. And when the promised outcomes were delivered, reconciling actions and inaction that led to the result also allows for replication of success.

And, after all, is that not the point of accountability? It is not a method for placing blame and pointing fingers but a means for getting better results. So, next time, make sure the math is accurate, and solve the problem—not blame or excuse it. **IQ**

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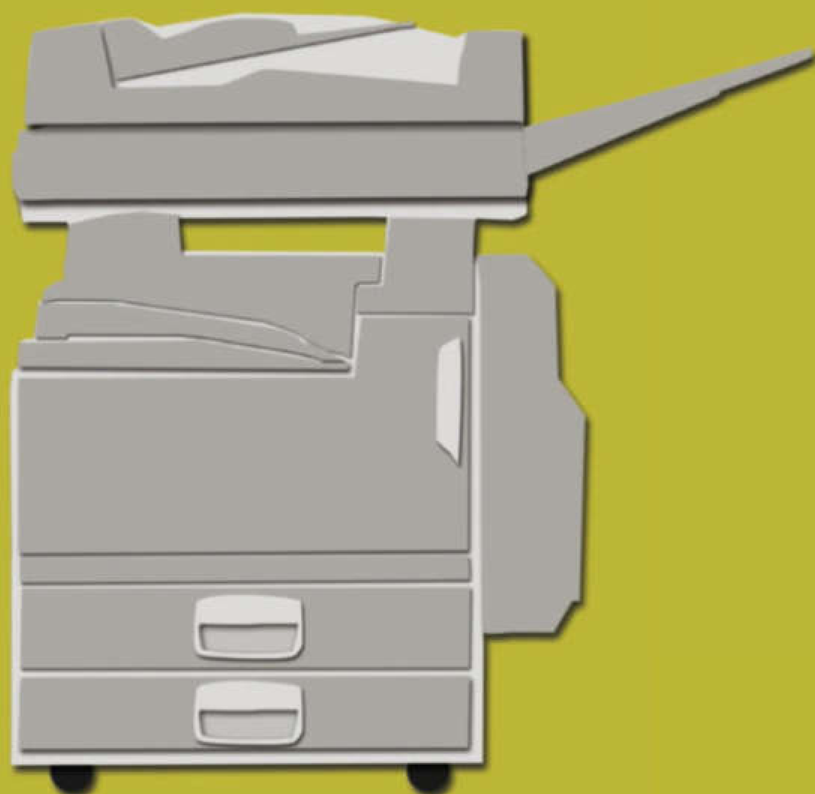

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INDICATORS

How to Tell What's Going On in China

RIGHT NOW Wall Street isn't worried about an economic slowdown in China so much as a collapse. But the country's volatile stock market doesn't reveal much about the fundamentals, and its GDP statistics—managed both on the downside, when the economy is worse than the government says, and on the rebound, when things are heating up more than it says—offer even less clarity. What's an investor to do? Here, three figures to watch to get a clearer picture of where China stands. *—Scott Cendrowski*

1 THE "LI KEQIANG INDEX"

NO LESS A FIGURE THAN China's Premier, Li Keqiang, once told a U.S. diplomat that he trusts his own index—which tracks electricity production, railway freight, and bank-loan growth—more than GDP, according to a WikiLeaks cable. Lots of researchers now use their own version of the "Li Keqiang index," tracking similar numbers. Right now it shows economic growth about three percentage points below the government's official GDP releases. One tool, the China Activity Proxy, compiled by research firm Capital Economics, says the economy slowed way down to 4% growth earlier this year but has improved in the last quarter to around 5%—contrary to recent dire headlines in the U.S.

2 SERVICE INDUSTRY

LAST YEAR SERVICES made up nearly half of China's economy, meaning that the country's consumers are so far powering through the slowdown. While nominal GDP in the first half of 2015 was negative in six northern Chinese provinces that depend on metals and mining, in coastal cities with big service sectors, nominal GDP increased nearly 10%. Expect the country's strong consumer base to help it ease off the gas instead of letting growth screech to a halt.

3 SOUTH KOREAN EXPORTS

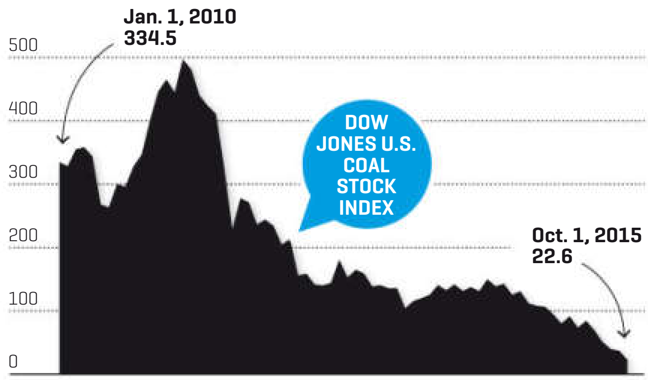
AUSTRALIA'S COMMODITY-DRIVEN ECONOMY relies on China more than any other. South Korea is No. 2, sending 23% of its exports to the country, and the range of products it ships (integrated circuits, cars, refined petroleum, and more) makes its trade statistics a good gauge of China's appetite. In August, South Korean exports dipped more than they had in six years, down 14.7% year over year. That improved in September, however, to a decline of 8%. Not great, economists say, but not terrible—maybe the best description of China's own economy.

HILL: COURTESY OF ALUN HILL; PERCIVAL AND TRISTEM: COURTESY OF UDEMY

MONETIZATION

MEET THE GUYS MAKING BANK BY TEACHING ONLINE

SO FAR, DESPITE ALL THE HYPE, few investors have gotten rich off the boom in online education startups. But that doesn't mean no one's making money. Udemy, which allows users to create their own online courses, has raised $113 million with a model that charges users a fee and pays teachers based on popularity—some more than others. Take ***Alun Hill,*** who used his earnings to move to a fortress in Malta after he recorded a series of popular classes (including one on how to make money on Udemy), which he says still brings in $1,000 a day. Former high school math teacher ***Rob Percival,*** the company's top instructor, has made more than $2 million since 2014. And Percival's friend and tennis partner, ***Ben Tristem,*** says he earns in the high six figures teaching game development. Not everyone gets to Malta, though: Average Udemy teacher take-home pay is $8,000. *—Claire Groden*



SELLING LOW

Coal Power Is on the Way Out, Divestment or Not

In the latest salvo in the war against coal, California passed a bill in September requiring state pension funds to sell their coal stocks. Soon after, New York City Mayor Bill de Blasio called for the city's five pension funds to do the same. Consider a dead horse beaten. Market forces have already savaged the U.S. coal industry. Cheap natural gas, which emits roughly half the carbon of coal, has become a favorite of utilities in the U.S. The amount of electricity produced from coal has declined from 50% in 2005 to 36% today. As a result, the Dow Jones U.S. Coal index has fallen 93% during the past five years, compared with a 75% rise in the S&P 500. Once again Wall Street has stayed one step ahead of the politicians. *—Brian Dumaine*

WHAT HAPPENS WHEN THE WORLD'S MOST POWERFUL WOMEN GET TOGETHER

By Patricia Sellers

THE 400-PLUS INFLUENCERS who converged on Washington, D.C., for the *Fortune* Most Powerful Women Summit in mid-October just happened to be female. Unlike most women's conferences, *Fortune*'s annual MPW Summit does not typically program "women content"—no glass-ceiling discussions or female-empowerment sessions here. What does happen is a deep dive into the most critical and timely issues by some of the world's most renowned leaders—*Fortune* 500 CEOs such as Mary Barra of General Motors, Ginni Rometty of IBM, and Ursula Burns of Xerox come to the MPW Summit each year. So does one male CEO who has a particularly evolved viewpoint on the importance of women leaders as drivers of global economic growth: Berkshire Hathaway's Warren Buffett. Besides sounding off on the state of global business, the legendary investor says he's betting on Hillary Clinton to win the presidency, though Ivanka Trump, in her first comment about her father's White House bid, isn't so sure. Go to fortune.com/mpw for full coverage of Most Powerful Women, and see our roundup of the highlights here.

1 BEST ADVICE

"Think of when did you ever learn the most in your life? What experience? I guarantee you'll tell me it was a time you felt at risk."

IBM chairman and CEO Ginni Rometty

2 BEST PROMISE

"In the next five to 10 years we'll see more change in the auto industry than we've seen in the last 50."

General Motors CEO Mary Barra

3 BEST DODGE

"That's a complicated question."

Ivanka Trump, on whether she's happy that her father is running for President (she's a supporter)

4 PRESIDENTIAL PREDICTION

"[Hillary Clinton] is by far the most likely person to get the Democratic nomination. I think she is the most likely person to be the President of the United States."

Oracle of Omaha Warren Buffett

5 COOLEST COMEBACK

"It's clear we may have overestimated his anger-management skills."

Fox News anchor Megyn Kelly, on what she learned from her feud with Donald Trump since the first Republican debate in August

6 WORTHY CAUSE

"I can't help but see myself in these girls. I can't help but see my daughters in these girls."

First Lady Michelle Obama, on girls she aims to help with Let Girls Learn, a global education initiative that many MPW have signed on to support

7 BEST SIGN OF PROGRESS

"When I joined journalism in 1979, 'harass' was two words instead of one."

Yahoo global news anchor Katie Couric, reflecting on her early career

ALL PHOTOS: STUART ISETT—FORTUNE MOST POWERFUL WOMEN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KEEP CLIMBING
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GREEN BUILDING U.S.A.

NO LONGER THE EXCEPTION, SUSTAINABILITY STANDARDS ARE BECOMING THE STANDARD.

THE GOOD NEWS IS PRINTED on the glass doors and LEED plaques of skyscrapers across America: Environmentally sustainable buildings are fortunately rising frequently enough to render the words "green building" redundant.

The U.S. Green Building Council's LEED (Leadership in Energy and Environmental Design) is the world's most widely used green building rating system. It has become common practice for commercial property developers like New York–based Related Companies. "We think of that as a standard of sustainability that we have as a company," says Gregory Gushee, an executive vice president at Related.

Indeed, a recent study from USGBC finds that by 2018 green construction will account for more than 3.3 million U.S. jobs–more than one-third of the entire U.S. construction sector.

Part of this success story is due to technology that is making sustainable development easier and more affordable—effectively broadening the acceptance of green building strategies among builders, says Rick Davenport, director for sustainable construction at BASF, one of the world's largest chemical producers.

"When we interview [businesses] about their monetary value for green, we get some pretty unrealistic answers of 10% or 15%" over the cost of constructing a typical building, he explains. However, "the sweet spot for the value for high-tech-performance green structures is about 2%" over conventional construction costs.

The good news, according to the U.S. Green Building Council, is that LEED certification doesn't have to cost more than conventional construction. And if extra upfront costs do arise, those can be recouped through faster lease-up rates, rental premiums, and increased market valuation, says Mahesh Ramanujam, chief operating officer of USGBC.

Additionally, if companies like BASF, which marries applied building science with innovative chemistry, can devise ways to lower costs with new building products, positive environmental impact could be significant, Davenport says.

"We know that buildings, depending on whose data you use, are responsible for 40 to 48% of our total resource use."

One recent BASF innovation is the HP+™ Wall System, which, as BASF scientists note, possesses enough structural strength to eliminate 10 to 30% of the wood framing in homes.

"That's an example of shifting cost," Davenport says. "We stayed in the 2% range"—or 2% over conventional construction costs—"so that's where people are going to buy."

Ultimately, the best-case scenario is for green buildings to have the ability to produce as much renewable energy onsite as they use. "Regardless of whether it's residential, commercial, new, or existing, we have to turn our attention to buildings and, more importantly, how to get them to net-zero energy use," Davenport says.

To help those builders, the U.S. Green Building Council has developed the LEED Dynamic plaque, a scoring platform that keeps tabs on a building's energy use, water use, waste reduction, and human experience while inside the space, Ramanujam says.

Green buildings will soon account for more than one-third of all U.S. construction.

COURTESY OF USGBC


We create chemistry that helps lush landscapes love thriving cities.
The construction industry currently accounts for about half of the world's consumption of energy and resources. It's a substantial amount - but it can be reduced, if you just add the right chemistry.
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When we can build more while using less, it's because at BASF, we create chemistry.
To share our vision visit wecreatechemistry.com/construction
150 years
BASF
We create chemistry

EXECUTIVE READ

BUSINESS LESSONS FROM A SOCCER GOD

Britain's foremost coach teams up with an influential Valley VC for a book on building an organization that can't stop winning. Here, *Fortune*'s review.

By Geoffrey Smith

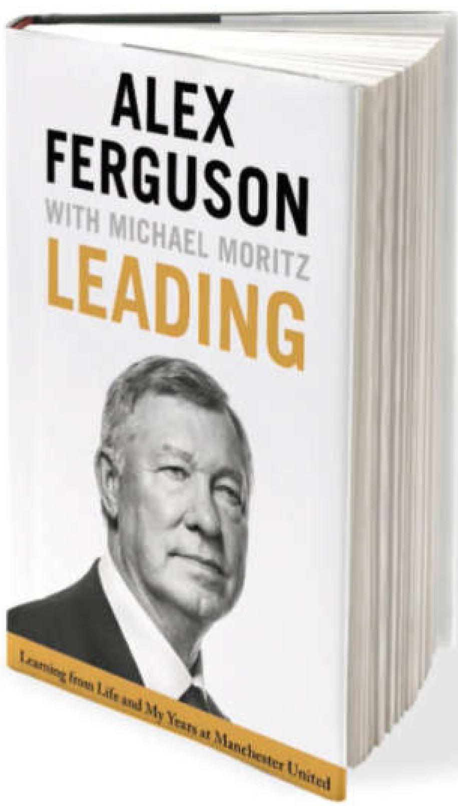
SIR ALEX FERGUSON is the most successful soccer coach in British history. He has won 49 trophies at national and European levels over a 40-year career in one of the most intensely competitive areas of human activity. So when he holds forth on the subject of leadership, it pays to listen.

His new book, *Leading: Learning From Life and My Years at Manchester United*, is a joint effort with Sir Michael Moritz, a former *Time* journalist, a longtime partner at Sequoia Capital, and a notable early investor in Google, PayPal, and others. With Moritz writing, Ferguson traverses ground that's familiar not only to any sports fan but also to nearly any business leader. What to make of star players with vanity complexes? "I quite embrace the ones with ego," Ferguson quips during a visit to *Fortune*'s offices in New York City. "Because they need to win." What do you do when top performers demand sky-high salaries? Pay them, because they're the ones driving results. "[The audience] is there to see the best players, and the best players get paid accordingly," he says.

Even though *Leading* is as much of a sports book as it is a business tome, a good deal of its boardroom advice amounts to common sense: A leader must listen and observe; must have discipline, drive, and conviction; must control, but must use power with restraint; must empathize with his followers, but must be willing to ruthlessly sacrifice them for the common good, even to the point—literally, in Ferguson's case—of selling his own son, a midfielder, to the Wolverhampton Wanderers Football Club. Think Machiavelli with a Glaswegian accent.

Yet any staleness in these truisms is dispelled by an ample helping of stardust. Ferguson brings his themes to life with an enviably rich stream of anecdotes. Manchester United's most beloved stars are trotted out in entertaining tableaux: Cristiano Ronaldo preening in front of the locker-room mirror while his teammates "threw socks and jockstraps at him"; the mountainous Danish goalkeeper Peter Schmeichel "going berserk" in Ferguson's office after being told that he wouldn't be made club captain; and David Beckham, lured with painstaking effort away from the clubs around his childhood home in London thanks to the assiduous cultivation of his family (always get the mother on your side).

While the book is an engaging read, it's not a wholly satisfying one. Although Ferguson often turns an unsparing lens on himself (including the time he was told off by an 8-year-old while talent scouting), it's ultimately as studiously inoffensive as would befit a book from someone less famously blunt. The occasional crises that peppered Ferguson's 26-year term at Manchester United, which one might think would provide some of his most teachable moments, mostly escape close examination. The need for control, which Ferguson stresses, seems to apply to the narrative as well as to the business. What remains is a feeling that there is more to leadership, especially Sir Alex Ferguson's exalted version, than this.



"I QUITE EMBRACE THE ONES WITH EGO," FERGUSON TELLS *FORTUNE*. "BECAUSE THEY NEED TO WIN."

COURTESY OF HACHETTE BOOKS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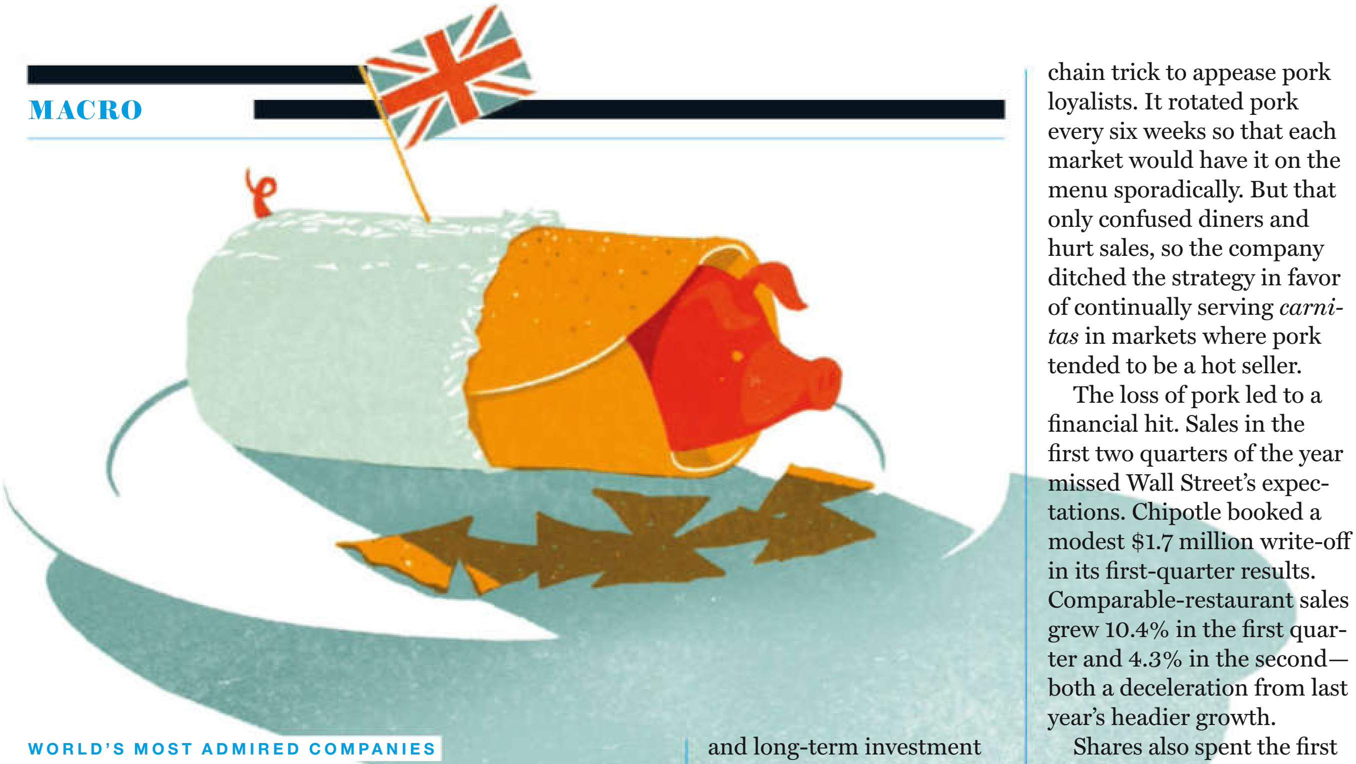

WORLD'S MOST ADMIRED COMPANIES

Chipotle Solves Its Pork Problem

COMPANY SNAPSHOT

No. 44

Headquarters
Denver

Employees
53,090

Revenues
$4.1 billion

Business
Chipotle Mexican Grill operates 1,783 made-to-order restaurants in six countries, including nine ShopHouse Southeast Asian Kitchens and two Pizzeria Locale restaurants.

THE POPULAR FAST-FOOD RETAILER STUCK TO ITS SUSTAINABLE-SOURCING POLICY DESPITE A SALES HIT—AND STILL WINS OVER INVESTORS. *By John Kell*

WHEN CHIPOTLE DEBUTED on *Fortune*'s World's Most Admired top 50 All-Stars list earlier this year, it did so after a five-year tear of 645% growth in the price of its stock, which hit a high of $758 a share this summer. The company's "food with integrity" promise has helped it build a reputation as a vendor of sustainably sourced meals. Four of the nine key attributes *Fortune* uses to measure admiration are quality of products, innovativeness, social responsibility to the community and environment, and long-term investment value—areas where Chipotle has consistently scored high marks on our survey.

Chipotle reinforced that commitment to its food when it suspended a major pork supplier in January after determining that animal-welfare protocols weren't being followed.

"Most organizations will have contingency plans for key suppliers," says Rick Blasgen, CEO of the Council of Supply Chain Management Professionals. "With the food industry, supplier relationships are tight."

While Chipotle was on the hunt for a new supplier, roughly a third of its restaurants didn't offer pork.

Chipotle had hoped it could persuade diners to try steak or chicken, but it turns out diners are in thrall to the other white meat.

"Our *carnitas* customers really love our pork, and they appear to be visiting less often or not at all until they know we have *carnitas* again in their market," chief financial officer John Hartung told investors in April.

At first, Chipotle tried a complicated supply-chain trick to appease pork loyalists. It rotated pork every six weeks so that each market would have it on the menu sporadically. But that only confused diners and hurt sales, so the company ditched the strategy in favor of continually serving *carnitas* in markets where pork tended to be a hot seller.

The loss of pork led to a financial hit. Sales in the first two quarters of the year missed Wall Street's expectations. Chipotle booked a modest $1.7 million write-off in its first-quarter results. Comparable-restaurant sales grew 10.4% in the first quarter and 4.3% in the second—both a deceleration from last year's headier growth.

Shares also spent the first half of the year in decline. In July the company named U.K.-based Karro Food its new pork supplier. After Chipotle recorded second-quarter results, the stock rebounded 11%. The company says *carnitas* will be back on menus by the end of November, and analysts are anticipating a sales rebound.

"Investors are willing to stomach something like this happening every couple of years," says R.J. Hottovy, a senior analyst at Morningstar. "But repeated incidents would lead to questions about the operation of the company."

Chipotle contends that any lost sales will be regained as it ramps up pork supply. Co-CEO and founder Steve Ells has said that many customers ultimately applauded the restaurant chain's policy.

"For more than 15 years, we've been working hard to change the way people think about and eat fast food," Ells says. Apparently investors approve.

ILLUSTRATION BY DANIEL STOLLE

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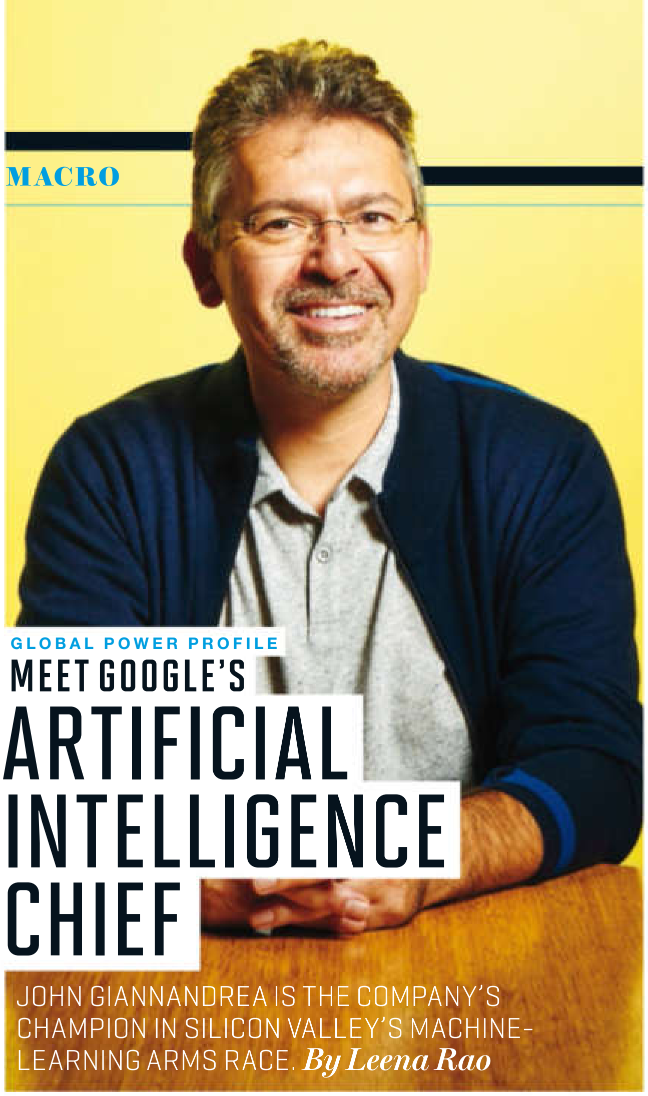

GLOBAL POWER PROFILE

MEET GOOGLE'S ARTIFICIAL INTELLIGENCE CHIEF

JOHN GIANNANDREA IS THE COMPANY'S CHAMPION IN SILICON VALLEY'S MACHINE-LEARNING ARMS RACE. *By Leena Rao*

The Scottish engineer is working to make computers more human.

GOOGLE'S HEAD of machine learning, John Giannandrea, has spent his professional life making computers smarter. But he's not overly impressed with their current intelligence. "I think computers are remarkably dumb," says Giannandrea, speaking in a stark conference room at Google's headquarters in Mountain View, Calif. "A computer is like a 4-year-old child."

Granted, that 4-year-old child has become crucial to the search giant's competitive technology. Google is currently a leader in the searing-hot field of artificial intelligence, developing computers with the power to incrementally learn to perform tasks like recognizing patterns in numbers and words. HAL 9000 it is not, but machines learning to pick out granular information from big data (say, search terms) have vast implications for business in the Valley, now inching toward a future in which robots can read, drive, and, for all intents and purposes, think.

Giannandrea, 50, was born in Bridge of Allan, Scotland. His first attempt at humanizing machines was an early personal assistant at an Apple spin-off called General Magic in the '90s. Its product looked like a smartphone primogenitor, but it fizzled in the pre-Internet era. Giannandrea went on to become the CTO at then Internet juggernaut Netscape. He later co-founded voice-recognition startup TellMe, which let users call a number for sports scores or even for a conversation with Santa Claus.

But word recognition, he realized, was just a small piece of the puzzle of computer-human interaction. In 1999, Giannandrea founded Metaweb, which catalogued connections between not just words but objects. Google bought it in 2010.

Giannandrea often refers to Captain Kirk's computer on *Star Trek*, which was capable of answering questions intelligently, as a motivating idea for his early projects. Once at Google, he spearheaded Knowledge Graph, which powers the box that pops up next to the search bar when you type in a query like "Sergey Brin's net worth." It uses machine learning and instantly searches databases to anticipate what you really want and combs the web to answer your question before you hit "submit." Not quite starship *Enterprise*–caliber, but closer than most.

Google isn't the only company plowing resources into AI—IBM's Watson division is revolutionizing the field of cognitive computing—but its focus on the technology is growing. Currently more than 100 teams are working with the machine-learning group, up from only a handful a year ago. In 2015 the company's machine-learning code consumed the most computing power of Google's systems.

These days, Giannandrea's focus is self-driving cars, for which machine learning is used to detect pedestrians. But the "holy grail," he says, is language understanding and summary. To get there, Google's engineers will need to mimic the human mind, a system still far too complex for even the most elite supercomputer to comprehend—for now anyway.

FRIEND OR FOE?

Tech luminaries have expressed dismay about the quickly developing field of AI and computer superintelligence.

STEPHEN HAWKING, PHYSICIST

"I think the development of full artificial intelligence could spell the end of the human race."

ELON MUSK, TESLA AND SPACEX CEO

"Potentially more dangerous than nukes."

BILL GATES, MICROSOFT FOUNDER

"I don't understand why some people are not concerned."

PHOTOGRAPH BY **BRAD WENNER**

HAWKING: DAVE J. HOGAN—GETTY IMAGES; MUSK: DAVID PAUL MORRIS—BLOOMBERG VIA GETTY IMAGES; GATES: BRUCE GLIKAS—FILMMAGIC/GETTY IMAGES

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SMALL, BUT MIGHTY (AND MOBILE)

Small businesses are using mobile technologies to operate more intelligently.

THE COMMUNICATIONS REVOLUTION triggered by the Internet, mobile devices, and social media has transformed not just our individual lives—it has also deeply affected the way we do business. And leaders of small businesses, with far more limited resources, are thinking hard about the impact of this new connectivity and mobility on their future.

In a survey of 1,250 senior executives at small- and medium-sized businesses in six countries, 65% said they were as dependent on their mobile phones as their laptops to do their work, and 35% of respondents said their companies were under more pressure than five years earlier to adopt mobile and flexible working practices (2013 survey by collaboration software maker Citrix). Much of the pressure on managers comes from employees who want to use their personal devices (cellphones, laptops, tablets) and who seek a lifestyle of working from home and on the road as well as in the traditional office.

Small businesses have benefitted from the explosion of cost-effective digital services now available to their teams. Companies can rent computing power and digital storage space from cloud vendors like Amazon Web Services, Rackspace, or Google Compute Engine, rather than tie up capital in their own computer software and hardware. Social networks like Facebook, Twitter, and Pinterest offer extraordinary digital marketing opportunities. Companies use video conferencing to pare down on travel expenses—a big concern at many small- and medium-sized companies.

Similarly, when heading to and from still-crucial face-to-face meetings, employees don't want to be cut off from their communications networks for even a heartbeat. For that reason, automakers like Toyota are scrambling to bring many of the features available at the office and on mobile devices to the dashboard. "The automobile can be perceived by drivers as a giant cellphone that, once inside, transports you where you want to go," says Mark Oldenburg, Toyota's national fleet marketing, mobility and strategic planning manager.

Toyota is offering Siri Eyes Free, a version of Apple's voice-command system, in some 2016 models. At the press of a button on the steering wheel, drivers will be able to verbally enter their GPS destinations, change stations on the radio, get a weather report, or have their email read to them. Another mobility aid is Toyota's Scout GPS Link, a downloadable app for Android and iOS devices that provides an inexpensive navigation system.

Says Oldenburg: "We are really focused on the needs of our business customers and helping them bring down their operating costs." ●


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Princess Buttercup, a goat from a local petting zoo, visits Square Root.

SHEPHERDING GREAT CULTURE

Austin-based software maker Square Root is growing the herd and taking over the neighborhood.

By Stacey Higginbotham

COURTESY OF SQUARE ROOT

BEST SMALL WORKPLACES
NO. 2

Square Root
AUSTIN
EMPLOYEES: 46
REVENUE: $10 MILLION

TWO YEARS AGO employees at Austin-based software company Square Root had a big problem. "There were 35 of us and only two bathrooms," complained Mary Feild, the marketing coordinator at Square Root. "It wasn't pleasant." The situation wasn't going to change anytime soon either. CEO Chris Taylor knew he had a problem, but he was also trying desperately to close on a new office near the startup's two existing buildings.

In the meantime, Taylor says, he knew that while he couldn't solve the problem, he could at least acknowledge it. So he had a service come three times a week to clean the company's two bathrooms. He also ordered a custom-designed toilet-shaped piñata from a local company to hang on the front porch of Square Root's office. Anyone who was frustrated with the bathroom situation could go beat the piñata. Feild and others did. The piñata is long gone, and now the company has 46 employees, six bathrooms, and $10 million in annual revenue.

Square Root ranks No. 2 on this year's list from Great Place to Work of the 25 Best Small Workplaces because it has never once let up on its focus on culture. "We do an

entire interview just for culture," says Baba Buehler, director of technology at Square Root, who has been at the company for five years. All job candidates are given problems to take home; they then return and present a solution. Because of the company's long hours, they must be excited about devoting time to problem solving with colleagues.

The company builds a software product that helps sales managers analyze and store data. Its customers include Nissan, Volkswagen, and other automotive companies. This year it is working to expand into the retail and restaurant sector as well. Taylor says that since it's a bootstrapped tech firm, culture is its best recruiting tool. Much of its feel-at-home, just-be-yourself culture has developed through Square Root's choice of offices.

Taylor first purchased an old Craftsman-style home a little more than a mile from downtown Austin in 2009 to house his four-person company. Two years later he purchased the house next door, since the company was outgrowing its headquarters. The original office was known as the Red House, and the office next door by its street number, 506.

When Square Root reached 12 people, Taylor decided to move half the team next door, but during a meeting two months later someone made a crack about "those people in the Red House." Taylor stopped the meeting and that afternoon moved everyone back into the Red House, turning the house next door into conference rooms.

Square Root now has four houses, each with a living room and some featuring a compelling theme. There's the Craft Brew House, which contains the company dartboard, and the Quiet House, where excessive conversation isn't permitted.

To ensure that the engineers don't all cluster in one house while the data scientists roam the halls of another, Square Root has implemented cross-functional teams, which they call herds, that put members of the engineering, product management, and data analytics groups together daily. The use of herds, Square Root says, refers to a companywide affection for goats. ("It's a software thing.")

In an example of how democratic the culture is at Square Root, an employee who had been on the job less than a month contributed a video and blog post that helped give the herd concept its final shape. Outside their herds, departments still have meetings twice a month and report to managers.

As the company approaches 50 employees, the next big question is how to grow bigger without losing the startup culture that has defined it for the past six years. And there are also the questions of how to find additional houses in real-estate-constrained Austin and what amenities to pack into them. "I'm not going downtown," says Taylor. "You're going to be competing against Google, which has taken 200,000 square feet of space. We just can't win at that game."

50 BEST SMALL AND MEDIUM-SIZE COMPANIES TO WORK FOR

Great Place to Work surveyed more than 88,000 employees at 450 small and medium-size businesses to determine which are the best employers. For more info, visit fortune.com/best-small-medium-companies.

SMALL COMPANIES (25–249 EMPLOYEES)

1 Radio Flyer
- CHICAGO
- EMPLOYEES: 58*
- REVENUE: $110 MILLION**

Workers at the toymaker say they're like a family. "I come each day excited to see what's in store and how we can improve ourselves," says one.

2 Square Root
- AUSTIN
- EMPLOYEES: 46
- REVENUE: $10 MILLION

Employees at this software company receive $3,000 to build their own dream workspace and enjoy a highly flexible work schedule.

3 Granite Properties
- PLANO, TEXAS
- EMPLOYEES: 150
- REVENUE: $183 MILLION

Lifers of this commercial real estate firm are rewarded for their tenure: After five years they receive a $500 bonus, and $1,000 after 10 years.

4 PPR Talent Management Group
- JACKSONVILLE BEACH, FLA.
- EMPLOYEES: 110
- REVENUE: $40 MILLION

Not only do employees enjoy unlimited paid time off, but the staffing company's offices are located directly on the beach, which means spectacular lunch breaks.

5 Ruby Receptionists
- PORTLAND, ORE.
- EMPLOYEES: 235
- REVENUE: $15.3 MILLION

This virtual reception desk starts employees off at $15 per hour, with an opportunity for a raise after six months and each year afterward.

6 Stellar Solutions
- PALO ALTO
- EMPLOYEES: 163
- REVENUE: $41 MILLION

The aerospace engineering contractor pays 100% of health care premiums for employees. Average comp for a systems engineer is more than $150K.

7 Talent Plus
- LINCOLN, NEB.
- EMPLOYEES: 106
- REVENUE: NOT AVAILABLE

Nearly 70% of this HR consulting firm's 115 employees are women. All employees get unlimited paid time off and flexible scheduling options.

8 Field Fastener
- MACHESNEY PARK, ILL.
- EMPLOYEES: 78
- REVENUE: $42 MILLION

The global distributor of fasteners awards quarterly bonuses, has an on-site fitness center, and offers free breakfast, snacks, and drinks every day.

*HEADCOUNT FIGURES ARE AS OF JULY 2015 AND REPRESENT FULL-TIME AND PART-TIME U.S. EMPLOYEES.

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9 Sage Rutty & Co.

ROCHESTER, N.Y.
EMPLOYEES: 57
REVENUE: $12 MILLION

There's a strong focus on employee training at this financial adviser, which hosts many on-site professional and personal development classes.

10 Engeo

SAN RAMON, CALIF.
EMPLOYEES: 147
REVENUE: N.A.

An exchange program at this engineering consulting firm encourages employees to work in any of the company's seven offices.

11 Dixon Schwabl

VICTOR, N.Y.
EMPLOYEES: 85
REVENUE: $53 MILLION

Fifty-two of the ad firm's 85 workers are women, who hold 77% of management roles. The agency says it looks for the "wow" in prospective employees.

12 Insomniac Games

BURBANK, CALIF.
EMPLOYEES: 183
REVENUE: $26 MILLION

Ted Price, founder and CEO of this independent developer of videogames, has group lunches with random Insomniacs on a weekly basis.

13 The Energy Project

YONKERS
EMPLOYEES: 32
REVENUE: N.A.

Napping is encouraged at this HR consultant, which has a Renewal Room that includes a daybed, yoga mats, and light-exercise equipment.

14 Limeade

BELLEVUE, WASH.
EMPLOYEES: 144
REVENUE: $13 MILLION

This employee-engagement platform has a director of culture and well-being who makes sure that all employees are satisfied with their workplace.

15 Kahler Slater

MILWAUKEE
EMPLOYEES: 103
REVENUE: N.A.

The design firm launched a new practice last year to prioritize its 20 best ideas and see them to completion. Creativity Fire Drills showcase team projects.

16 Integrated Project Management

BURR RIDGE, ILL.
EMPLOYEES: 133
REVENUE: $25 MILLION

Employees who refer business to this consulting firm receive a development incentive that equals 3% of the first year's revenue from the new client.

17 Axis Communications

CHELMSFORD, MASS.
EMPLOYEES: 224
REVENUE: N.A.

Every new hire of the digital surveillance company is flown to global headquarters in Lund, Sweden, within the first year for a three-day orientation.

18 BP3 Global

AUSTIN
EMPLOYEES: 55
REVENUE: $13 MILLION

This software designer pays 100% of health care premiums for employees and eligible dependents, including $200 monthly payments into HSAs.

Team members from Macedon Technologies compete at the annual friends and family picnic.

"WE LOOK FOR PEOPLE WHO HAVE THE INTRAPRENEURIAL SPIRIT. THEY BELIEVE ANYTHING IS POSSIBLE AND ARE ALWAYS THINKING BIG AND BOLD ABOUT WAYS TO INNOVATE AND TAKE RISKS." —LIMEADE, NO. 14

19 Macedon Technologies

RESTON, VA.
EMPLOYEES: 35
REVENUE: $6.2 MILLION

Employees who recruit friends to this software maker are given bonuses and "toys," which include GoPro cameras, Xboxes, and Apple Watches.

20 Squaremouth

ST. PETERSBURG
EMPLOYEES: 25
REVENUE: $4.5 MILLION

All employees at this online resource for travel insurance receive unlimited paid vacation after one year and must take off at least 10 days a year.

21 Disher Design & Development

ZEELAND, MICH.
EMPLOYEES: 89
REVENUE: N.A.

This product-design consultant gives all its full-time employees, regardless of their position, corporate stock and twice-yearly profit-sharing bonuses.

22 Mammoth HR

PORTLAND, ORE.
EMPLOYEES: 40
REVENUE: $3 MILLION

This HR services company gives unlimited vacation days after one year on the job. After five years, a two-week paid sabbatical and $1,000 are offered.

23 Greenleaf Trust

KALAMAZOO
EMPLOYEES: 95
REVENUE: N.A.

The wealth management firm pays 100% of health care premiums, including for dental and vision programs, for employees and their families.

24 Snagajob

GLEN ALLEN, VA.
EMPLOYEES: 95
REVENUE: N.A.

The job-search site has no dress code. "Comfort is key, whether jeans, sneakers, a dress, or flip-flops. We are more concerned with output than attire."

25 Ontraport

SANTA BARBARA
EMPLOYEES: 102
REVENUE: $11 MILLION

The software designer organizes employee trips, including an annual skiing and snowboarding adventure and an expedition to Ecuadoran rain forests.

COURTESY OF MACEDON TECHNOLOGIES

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BEST MEDIUM-SIZE WORKPLACES
NO. 1

Intuitive Research & Technology
HUNTSVILLE, ALA.
EMPLOYEES: 292
REVENUE: $271 MILLION

A COMPANY WITH NO JOB OPENINGS

A defense contractor's no-layoffs record is as unusual as its hiring practices: Recruiters look for standout talent, not to fill jobs.

[redacted]

By Claire Zillman

As part of a Biggest Loser program, employees at Intuitive ran in Huntsville's Spooktacular 5K.

INTUITIVE RESEARCH & TECHNOLOGY says it has never laid off an employee. That's impressive for any company, but it's especially notable for a 16-year-old aerospace engineering and analytics firm that's a contractor for the federal government. Its industry is notoriously cyclical, with resources and staff that typically ebb and flow.

"We haven't had to worry about layoffs," says Dexter Edwards, a task lead who's worked for the company since 2009. "They hire for a person's ability, not necessarily for a specific position."

That's one of the reasons the company, based in Huntsville, Ala., appears at No. 1 on Great Place to Work's list of the 25 Best Medium-Size Workplaces.

Harold Brewer, Intuitive's co-founder, chairman, and president, says the company has avoided reductions by taking a unique approach to hiring. "We don't really have job openings," he says. Instead, the company operates like a talent agency—always scouting for skilled employees. Anyone referred by an existing employee or client is guaranteed an interview and is often hired even if there's no set job to do. Brewer calls it a "speculation hire."

That tactic is the reverse of what might be normal within the industry—to win a contract and then hire a team to staff it. But Brewer says Intuitive's approach helps ensure that an employee's job doesn't end when a contract is finished.

Intuitive also supports employees' professional growth with unlimited tuition reimbursement. Edwards has earned certificates in logistics and federal contract management and is now pursuing an MBA.

Brewer says his motto is, "If it's good for employees, it's good for business."

That catchphrase also applies to Intuitive's stance on pay. In a city where the median income is $30,900, Intuitive's senior program analysts make about $125,000 and can snag $18,000 in bonuses. All employees—regardless of title or pay—are eligible for extra compensation that the company doles out spontaneously and near year's end. Lisa Roberts, an office administrator at Intuitive, says she recently received an on-the-spot bonus equal to one paycheck. "It absolutely floored me," she says. "I wasn't expecting it."

Brewer explains that the spot bonuses are a way for the company to give an "immediate response" to performances that stand out, instead of waiting for a yearly review. Intuitive isn't just not letting employees go; it's actively enticing them to stay.

MEDIUM-SIZE COMPANIES (250–999 EMPLOYEES)

1 Intuitive Research & Technology	2 Atlassian	3 ESL Federal Credit Union	4 4imprint
HUNTSVILLE, ALA.	SAN FRANCISCO	ROCHESTER, N.Y.	OSHKOSH, WIS.
EMPLOYEES: 292	EMPLOYEES: 439	EMPLOYEES: 681	EMPLOYEES: 645
REVENUE: $271 MILLION	REVENUE: $215 MILLION	REVENUE: N.A.	REVENUE: $415 MILLION
Workers at this defense contractor can attend on-site training boot camps to help them prepare for job-related certification exams.	The maker of HipChat communication cloud software has a beer cart on Fridays, gives employees a week off to volunteer, and offers free lunch every day.	The financial services company is known for its fun social events and activities, which have included an ESL's Got Talent! competition.	This promotional product company's Donate PTO program allows workers to use accumulated hours to assist anyone dealing with an emergency.

COURTESY OF INTUITIVE RESEARCH & TECHNOLOGY

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No. 10 HubSpot's marketing team lured colleagues to an open house with bacon-covered doughnuts.

5 Squarespace

- NEW YORK CITY
- EMPLOYEES: 376
- REVENUE: N.A.

Most of the employees at this website design software company are under 35, and enjoy free breakfast, lunch, and take-home meals every day.

6 Etsy

- BROOKLYN
- EMPLOYEES: 617
- REVENUE: $196 MILLION

The online marketplace for handmade goods hosts an annual Hack Week when employees take time away from regular work to devote to special projects.

7 Assurance

- SCHAUMBURG, ILL.
- EMPLOYEES: 377
- REVENUE: $76 MILLION

Employees at this insurance brokerage have a chance to spin the "Wang Chung Wheel" at quarterly Assurance Casinos for a chance to win $300 cash.

8 Cirrus Logic

- AUSTIN
- EMPLOYEES: 660
- REVENUE: $916 MILLION

This maker of semiconductor chips sponsors happy hours and rock concerts at the office and offers free tickets to local music festivals.

9 Centro

- CHICAGO
- EMPLOYEES: 525
- REVENUE: $286 MILLION

You'll find few complainers at this digital ad tech firm. All employees are encouraged to take a three-week sabbatical every four years.

"DURING INTERVIEWS WE ASK HOW CANDIDATES WOULD USE $50K, WHAT STARTUP THEY'D LAUNCH, AND WHAT WAS THEIR MOST RECENT FAILURE."
—HUBSPOT, NO. 10

10 HubSpot

- CAMBRIDGE, MASS.
- EMPLOYEES: 798
- REVENUE: $116 MILLION

This marketing and sales software maker's "Always be growing" mantra encourages staff to teach classes to one another and host "mystery dinners."

11 Peckham

- LANSING
- EMPLOYEES: 342
- REVENUE: $141 MILLION

The vocational rehabilitation nonprofit gives employees company phones that have unlimited usage plans—which are used to share success stories.

12 Hagerty

- TRAVERSE CITY, MICH.
- EMPLOYEES: 662
- REVENUE: N.A.

Workers rave about the culture at this insurer of vintage cars, which offers paid time off for community service and birthdays.

13 Holder Construction

- ATLANTA
- EMPLOYEES: 711
- REVENUE: $1.7 BILLION

This construction company closes at 3:30 p.m. on Fridays so associates can take advantage of reduced traffic and have more time with their families.

14 Marco

- ST. CLOUD, MINN.
- EMPLOYEES: 890
- REVENUE: $180 MILLION

The IT services company has a wide range of flexible work options, including telecommuting, flexible scheduling, and compressed workweeks.

15 eVestment

- MARIETTA, GA.
- EMPLOYEES: 289
- REVENUE: $63 MILLION

Employees of this online investment site are allowed to take as much time off as they need, as long as they get their work done and meet goals.

16 Point B

- SEATTLE
- EMPLOYEES: 566
- REVENUE: $130 MILLION

An ESOP makes this management-consulting and investment firm 100% employee-owned and gives everyone a stake in the game.

17 West Monroe Partners

- CHICAGO
- EMPLOYEES: 542
- REVENUE: $110 MILLION

Even though the consulting firm's staff is scattered across the country, workers say there's a strong collaborative vibe.

18 Clif Bar & Co.

- EMERYVILLE, CALIF.
- EMPLOYEES: 385
- REVENUE: N.A.

All employees of the nutritional food and drink maker are invited to the annual ski trip—the company picks up hotel, lift tickets, and dinner.

19 Capco

- NEW YORK CITY
- EMPLOYEES: 859
- REVENUE: $527 MILLION

The financial consultant provides up to $10,000 in adoption assistance and up to 16 weeks of paid leave for the primary caregiver of a new child.

20 Yext

- NEW YORK CITY
- EMPLOYEES: 321
- REVENUE: N.A.

Staff at this software company love its nap pods, beer meetings, and videogames, but say the best perk is a creative and supportive environment.

21 American Transmission

- WAUKESHA, WIS.
- EMPLOYEES: 635
- REVENUE: $635 MILLION

This power company pays the entry fees for employees and their family members to participate in local fun runs, charity walks, and bike rides.

22 EKS&H

- DENVER
- EMPLOYEES: 540
- REVENUE: $81 MILLION

All employees at this accounting firm get feedback at the end of a project or every quarter—and are asked for "upward" feedback for their supervisors.

23 Walker & Dunlop

- BETHESDA, MD.
- EMPLOYEES: 468
- REVENUE: $360 MILLION

The commercial real estate financier recognizes longtime employees with awards that have ranged from $2,000 bonuses to trips valued at $25,000.

24 Xactly

- SAN JOSE
- EMPLOYEES: 259
- REVENUE: N.A.

Employees at this provider of HR tools say they enjoy their colleagues, and 92% say that promotions consistently go to those who deserve them.

25 Roth Staffing

- ORANGE, CALIF.
- EMPLOYEES: 532
- REVENUE: $283 MILLION

The job-placement agency recognizes top performers with an annual all-expenses-paid trip to Maui—and they are permitted to bring one guest.

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Mapbox CEO Eric Gundersen (rear) at his "office" of the moment, which keeps him close to colleagues.

THE NEW STAND-UP MANAGEMENT

Forget the corner office. Some CEOs are discovering they get more from their troops when they have no office. *By Jennifer Alsever*

CROWDFUNDING FIRM INDIEGOGO has 130 employees in its San Francisco headquarters, and each has his or her own desk. Well, all but one. That lone exception isn't a part-timer or an intern. It's the CEO. It's the latest wrinkle in office design intended to maximize creativity and communication inside a company.

"I want to show I'm available," says Indiegogo CEO Slava Rubin. "I love to pop in to discussions and hear that unfiltered information." By leaving his laptop at home, taking walking meetings, and using his iPhone to delegate tasks, he says, he can stay engaged instead of being stuck in his own email.

Certainly it's not uncommon for top execs to work alongside rank-and-file employees in open-plan offices. What could be called the itinerant CEO is the next step in that evolution, a change facilitated by the ever-increasing mobility of work and streamlining trends, such as storing files in the cloud.

Indiegogo's Rubin is not alone. Scott Heiferman, CEO of Meetup.com, doesn't have a desk. Nor do HubSpot co-founder and CEO Brian Halligan and COO JD Sherman. (Needless to say, it's younger enterprises that are leading the way in this approach.)

Even top execs who do have desks don't automatically claim prime real estate. HubSpot co-founder and CTO Dharmesh Shah does have an assigned space, but he routinely gets kicked out of it if a new hire needs a place to sit. Shah doesn't mind. "It also helps other parts of the company get to know me a bit," he says, "so I'm not just some fictional character that writes late-night emails and gets up on stages every now and then."

It can speed up communication and decision-making, says Eric Gundersen, CEO of Mapbox, a San Francisco startup that powers maps for sites like Foursquare and Pinterest. He usually sets up his laptop to work at a high-top kitchen table. COO Bonnie Bogle chooses different tables depending on what she's doing, and CTO Young Hahn often works from a couch. "My office is wherever I open my laptop," Gundersen says.

By floating around the office, he can overhear conversations and string them together to make better decisions. Just weeks ago, Gundersen says, he overheard an employee he happened to be sitting near react to the clarity of a satellite image on his computer screen, exclaiming that he could count the sheep on a hillside in the photo. Because just days earlier Gundersen had sat next to people in sales, he knew that team was courting a big real estate client in New Zealand. He shared that image with the sales team, and within hours the photo hit the company's blog—and Mapbox landed the Kiwi client. Says Gundersen: "There is a certain level of serendipity you can find by moving around."

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CREATE A THIRD MARKETPLACE

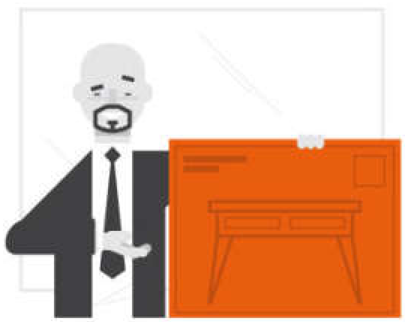
To bypass competition from both used-car lots and new-car dealers, driversselect, an online marketplace for previously owned vehicles in North Texas, created a new, more profitable niche. It sells only automobiles that are one to three years old, are "accident-free," and qualify for new-car financing rates. It markets them as a "new-car alternative," says founder Steve Hall. Since eliminating older models from its mix in the first quarter, the company has increased its monthly revenue by 75%.

5 Ways to Avoid Commoditization

COMPETITION IS RELENTLESS AND BRUTAL. THESE SIMPLE STRATEGIES WILL HELP YOUR COMPANY STAND OUT. *By Verne Harnish*

TARGET THE RIGHT CUSTOMERS

Instead of chasing every sale, focus on clients willing to pay what your product or service is worth; don't worry about losing the other 80%. That approach has helped Smart Dolphins, an IT support company in Victoria, B.C., grow its revenue 13% annually in the past two years, to nearly $2 million—even though it whittled its customers from 200 to 50 over six years, says CEO Dave Monahan. A side benefit of having clients who truly value the company's services: "excellent" employee retention.

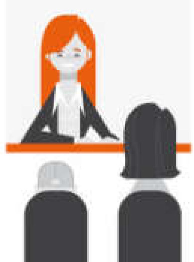


ADD A DOSE OF EXPERTISE

Chris Parker, president of Innvision Hospitality in Griffin, Ga., knows his hotel clients can easily buy the furniture and fixtures his firm sells from rivals. To stand out, the 90-employee distributor has created an army of highly trained local and regional procurement consultants, who guide franchisees of big chains on how to achieve the look the parent company wants—a service that is critical to them. Innvision also provides interior-design support. "We think of ourselves as selling a service, even though it's totally a product," says Parker, whose firm has annual revenue of $60 million.

DON'T KEEP THEM WAITING

To serve new patients quickly, North Shore Pediatric Therapy in Chicago plans to expand from seven to nine locations by next year and hires therapists ahead of demand. "Our competitors have three-month wait lists," says co-founder Dr. David Michael. North Shore also trains its therapists extensively in the personal skills that keep patients happy. That has enabled it to maintain a high percentage of private payers.



AMP UP THE PERSONAL TOUCH

At many pediatric clinics, parents' first contact is with a harried receptionist. By contrast, North Shore has trained nine "family-child advocates" to answer every call and spend as much time as needed to refer worried parents of children with autism and other conditions to the right specialist. "In today's world of technology, people are hungry for that personal touch," says North Shore's director of client experience, Maureen Evans. That extra TLC has helped the 170-employee firm, founded in 1999, approach $10 million in revenue this year, even with insurance reimbursements declining.

ILLUSTRATIONS BY MARTÍN LAKSMAN

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DO MILLENNIALS WEAR ARGYLE?

IN THE WORLDS OF HASHTAGS AND GOLF HOLES, THE FACE OF GOLF IS YOUTHFUL.

GOLF HAS LONG FOUGHT the notion, at least in some quarters, that it is an old man's game. Even at the highest levels of professional competition on the PGA TOUR, conventional wisdom held that, outlier Tiger Woods notwithstanding, a player didn't peak until his mid-30s, when emotional maturity and hard-won experience merged with physical abilities and nerves that hadn't yet begun their inevitable decline in middle age. Then Jordan Spieth (22) won the FedExCup and, together with Rory McIlroy (26) and Jason Day (27), captured five of the last six major championships. Plus, Rickie Fowler (26) took home THE PLAYERS Championship in May 2015 as well as a FedExCup Playoffs event—the other three went to Day and Spieth—and that thinking went flying out the window.

In its place came theories about why "the kids" were winning. More competitive opportunities at a younger age. Better coaching. Technology such as launch monitors and swing analyzers. Or maybe it was just because, as youngsters, they'd seen Woods' dominance but hadn't been beaten down by it themselves.

Regardless, the emergence of these fearless twentysomething stars—a list that also includes, among others, PGA TOUR winners Harris English, Brooks Koepka, Hideki

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Matsuyama, and Patrick Reed—comes at a welcome time for the TOUR and for the game itself. A 2015 study by the National Golf Foundation (NGF), "Golf and the Millennial Generation," noted that the number of 18- to 34-year-olds playing golf had dipped from roughly 9 million in the Gen X heyday of the mid-1990s to just over 6 million today. According to the NGF, though, that's still 26 percent of all golfers, and as a group, millennials are responsible for about $5 billion in golf-related spending. That more than 12 million millennials indicated they were "very or somewhat interested in the sport" was also encouraging. Still, changing U.S. demographics (a much lower percentage of non-Caucasians play golf than Caucasians), limited leisure time (and more awareness of different options for those out-of-office hours), and belt-tightening (post–Great Recession), for starters, are all clear headwinds.

Different segments of the golf industry have naturally responded differently, all united by the notion of trying to attract millennials at least partly on their own terms. More course operators, for example, have begun to promote nine- and 12-hole rounds as less time-consuming and costly. Some have even added FootGolf, a soccer-golf hybrid, to the playing menu. The NGF report noted, slyly, that "[g]olf could stand to chill out a little," and many private country clubs have indeed tried to relax rules that might be deemed stuffy. Goodbye, mandatory blazers in the clubhouse; hello, denim.

THE TOUR SWINGS FOR MILLENNIALS

Professional golf's biggest stage, the PGA TOUR, has proven extraordinarily resilient to date, with purses and sponsorships that seem to rise steadily both in high tides and low. The presence of one of the world's biggest sports stars in Woods has certainly helped; so, too, does a wealthy core fan audience. If historically that audience tended to skew gray or graying, younger people always still eventually found their way to golf fandom. But the TOUR is not sitting still, assuming the next generation will show up automatically.

"When we took a look at how this generation was consuming content and what resonates with them, we became a bit concerned that the traditional approach might not work," says Rick Anderson, the PGA TOUR's executive vice president for global media. "We needed to make sure that we could find them where they were, speak to them in a tone that would resonate, and give them content in forms and formats they would consume."

"GOLF COULD STAND TO CHILL OUT A LITTLE."

—THE NATIONAL GOLF FOUNDATION REPORT "GOLF AND THE MILLENNIAL GENERATION"

As Anderson suggests, millennials are notoriously as diverse in their media pursuits as they are engaged by them. So the PGA TOUR's focus on content for the future has meant a multitude of approaches. PGA TOUR LIVE, a subscription-based digital platform service offering live tournament coverage of featured groups during morning competition before the start of regularly scheduled television coverage, is one recent initiative. Another, perhaps more surprising one, is Skratch TV, a digital video network offering golf content specifically geared toward a younger audience, which launched in March after two months of foundation-laying on various social networks. (The name cleverly evokes both youthful rebellion, in its purposeful misspelling, and golf authenticity, as "scratch" refers to a player with a 0 handicap, i.e., one who generally shoots par rounds.)

Skratch TV, a joint venture between the PGA TOUR and digital media company Bedrocket, features daily golf video—original and curated—plus special production and highlights from PGA TOUR events. And, like any modern aspiring celebrity, Skratch TV has its own website and a presence on Facebook, Twitter, Snapchat, Instagram, Vine, and YouTube.

Another shocker to those who are stubbornly convinced the TOUR is nothing but double-pleated khakis: a Twitter-activated vending machine. Introduced at The Barclays and used at all four events of the FedExCup Playoffs, the FedExCup Twitter Vending Machine lets fans "pay" with a tweet (in this

instance, responding to the prompt "Who is your favorite PGA TOUR player in the FedExCup Playoffs?") and activate the machine for a free prize, including TOUR pro–autographed merchandise, upgraded tickets, and souvenirs.

"This program gives fans a unique opportunity to experience a type of technology they probably haven't seen before," says Sloane Kelley, executive producer for PGA TOUR Digital. "The entire experience, from using the machine to getting a prize, is the kind of thing people will want to tell their friends about, earning them instant social currency. From our perspective, the really powerful thing about it is that it shows how we can bridge the online and offline world to create a meaningful experience for our fans."

The millennial Kelley herself is an example of a new breed of executive, a non-golf fan when she was hired by the TOUR from an ad agency, where she helped consumer brands create campaigns on social media platforms.

"Two years ago, when we were looking to fill that role, we intentionally looked for someone outside of sports and golf, to bring a different set of experiences and different perspective to what we were doing on our platforms," says the PGA TOUR's Anderson.

STAR POWER

If the TOUR has been helped in appealing to a young, hip crowd by the on-course success of charismatic millennials such as Spieth, Day, McIlroy, and Fowler ("Their winning makes the job of reaching out to that audience a lot easier," Anderson notes), the off-course social media exploits of those players, and those of many older pros, too, have likewise aided the cause. The TOUR has a digital communications manager, Preston McClellan, who works directly with pros to help them push out their messaging and participate in TOUR-driven initiatives as well. These days, most players don't require much prodding to do so ... and they know their emojis from their emoticons.

So, too, does the audience for their output. The main difference between PGA TOUR fan millennials and other millennials is that, based on well-above-average income and education levels, the former skews "young professional"—and thus all the more desirable to the TOUR's sponsors. As such, expect to see more millennial-driven initiatives, which this year have also included #TOURFix presented by Konica Minolta, a digital golf clinic on the PGA TOUR's Twitter account where fans submitted their swing videos and questions, and The Presidents Cup Twitter Voting Cards that let fans choose from two clothing options for the U.S. and international teams to wear at the biennial golf competition that took place in October in South Korea.

The various efforts to woo millennials have already borne fruit. According to the TOUR, PGATOUR.COM was up 56% year-over-year in the 18-to-34 age group. The percentage of millennials has risen from 15% in 2014 to 19% this year. In May 2015—the month millennial fave Fowler won THE PLAYERS, not coincidentally—PGATOUR.COM counted 25% of its audience as millennials. In August, 1.27 million millennials engaged with PGATOUR.COM, the highest number in its history and up from 1.01 million the year before.

#Millennials #Golf #TheFutureIsNow.

—Evan Rothman


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This Patek Philippe Grand Complications retails for $280,000.

COURTESY OF PATEK PHILIPPE

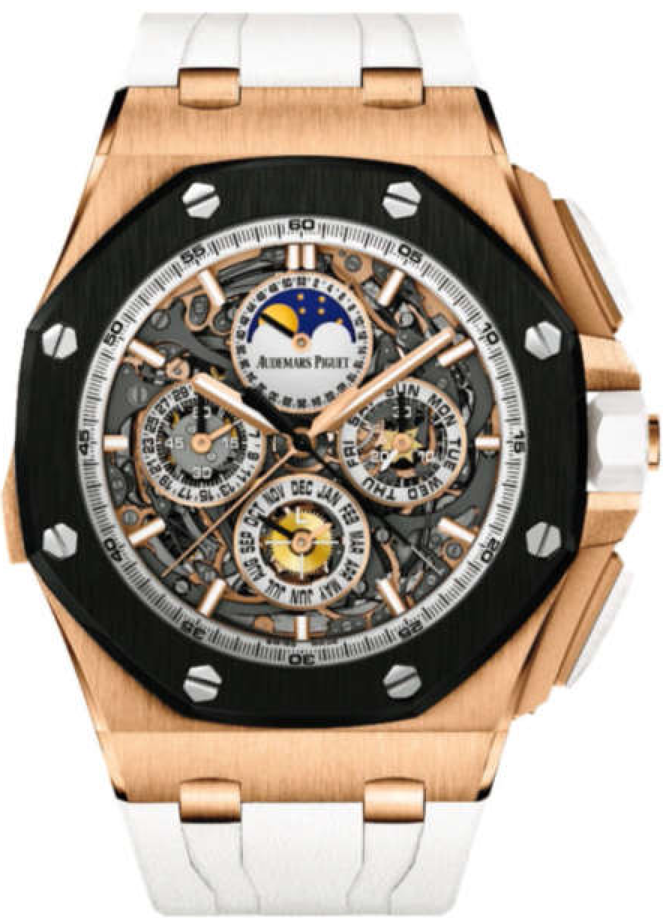
HAUTE HORLOGERIE

By Colleen Kane

LUXURY TIMEPIECES TELL the time, and they do so with great accuracy—but telling the time is almost secondary in importance. Ultra-high-end watches tell a story. They may serve as a signifier of the stature and taste of the wearer. They often represent a heritage watchmaker, perhaps even one that invented now-common watch functions, with past clientele made up of royalty.

Which helps explain why the Apple Watch, so far, hasn't had a big impact on the high-end watch market, according to consultancy Bain & Co. "Men especially have precious few things to indicate who they are. Traditional watches are one of the few and very powerful ways of designating your status," says Ariel Adams, editor of aBlogtoWatch and author of *The World's Most Expensive Watches.* Looking for a wrist-worn status symbol of your very own? Here are six current horological investments.

Glashütte Original Senator Cosmopolite is made for the traveler.



Audemars Piguet Royal Oak Offshore Grande Complication

1. PATEK PHILIPPE GRAND COMPLICATIONS 5271P-001

Timepieces by Swiss watchmaker Patek Philippe & Co. have set numerous worldwide price records at auction. This Grand Complications model is made of platinum and has an alligator strap. The black lacquered clock face features a baguette diamond marking 12 o'clock and 58 baguette diamonds around the bezel. This manually wound watch, which is water-resistant to 30 meters and has a perpetual calendar with moon phases and a smaller dial showing the seconds, retails for **$280,000.** "It's a super-nice traditional watch in a modern size," Adams says. Take traditional refinement and add diamonds. What you get is not for everyone. The addition of those diamonds also raises the price $100,000 over similar versions like the 5270.

2. GLASHÜTTE ORIGINAL SENATOR COSMOPOLITE

German watchmaker Glashütte Original manufactures classic-style watches with its own movements, and the company boasts 10 proprietary movement innovations. The Senator Cosmopolite is designed for the convenience of the world traveler. The main dial showcases the local time, and there's a subdial for the time at home, as well as a time zone corrector, a time zone display, and the local date. "This is an amazing travel watch," says Adams. But then again, your mobile phone probably has these same functions, so you should love how this watch looks. Hand-finished and featuring an alligator strap, this watch retails for **$43,500** in rose gold or **$43,300** in white gold.

3. AUDEMARS PIGUET ROYAL OAK OFFSHORE GRANDE COMPLICATION

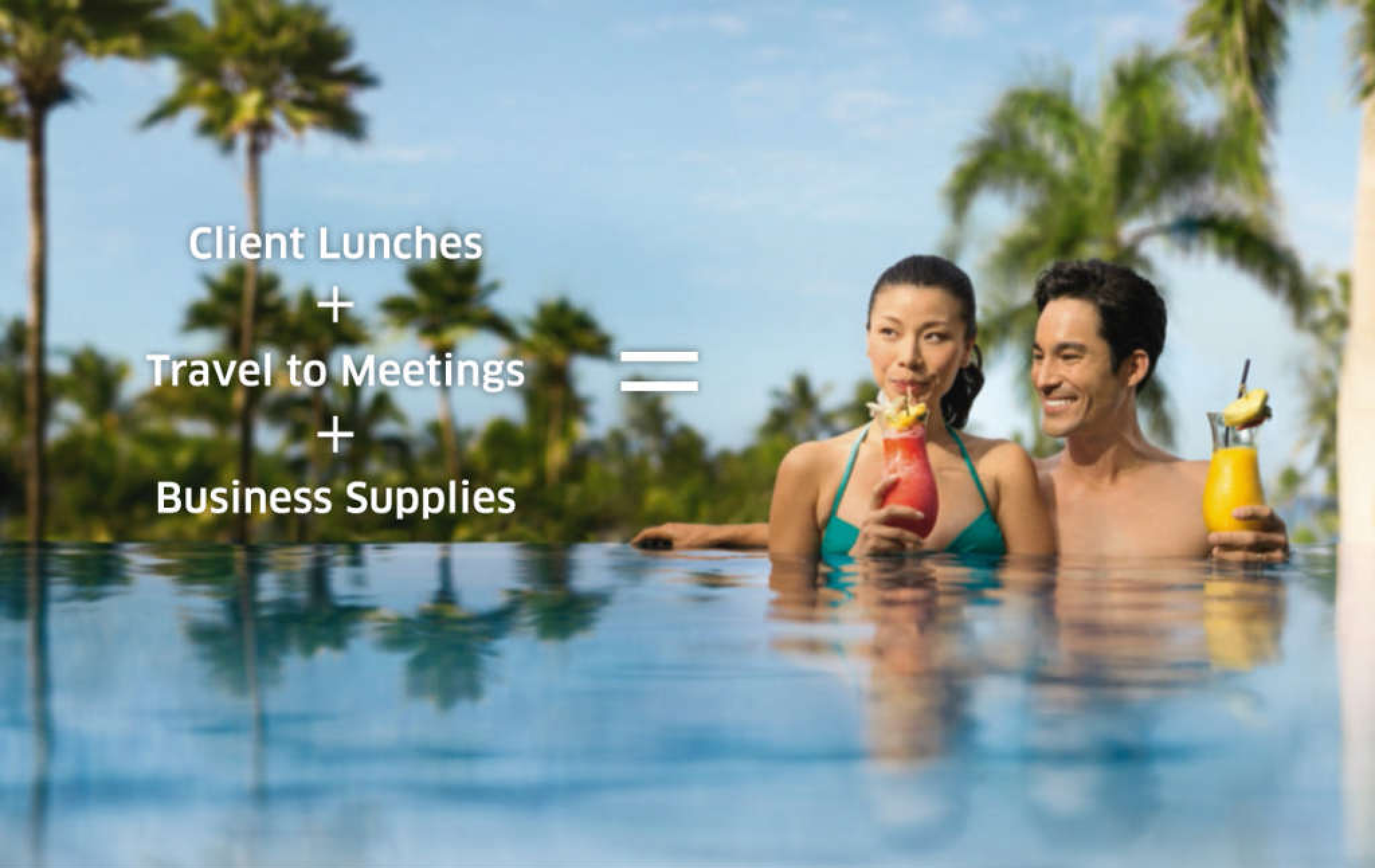
The Swiss watchmaker Audemars Piguet has supplied the movements for timepieces by Tiffany & Co., Cartier, and Bulgari. With the brand's Royal Oak Offshore Grande Complication, the complex interior machinery can be observed from both the front and the back of the timepiece, including a rotor that can be custom-engraved. The look is contemporary and sporty, in an 18-karat pink-gold case with a smoked-sapphire dial, pink-gold hour markings, and a white rubber strap with an 18-karat gold buckle. It's self-winding, and as a grand complication timepiece, it features chimes, a perpetual moon-phase calendar, and a stopwatch. "You have a very historic brand," Adams adds. All this for **$740,000.**

The Breguet Tradition 7047: echoes of the pocket watch

4. BREGUET TRADITION 7047

The French luxury-watch manufacturer Breguet dates back to 1775 and counts Marie Antoinette and Queen Victoria among its early patrons. The House of Breguet's Tradition 7047 (about **$245,000**) features an off-center, engraved dial. This

CLOCKWISE FROM TOP LEFT: COURTESY OF GLASHÜTTE; COURTESY OF BREGUET; COURTESY OF AUDEMARS PIGUET



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Bovet Amadeo Fleurier Virtuoso VII Retrograde (left) and Hublot Big Bang Perpetual Calendar

FROM LEFT: COURTESY OF BOVET; COURTESY OF HUBLOT

grand complication "combines some very interesting technology: fusee tourbillon, which Breguet himself invented," Adams says. This platinum timepiece has a constant-force mechanism (a centuries-old invention) to ensure accuracy. The Tradition 7047, Adams says, combines "two very cool complications, and does it in a way that's reminiscent of the original Breguet pocket watches."

5. HUBLOT BIG BANG PERPETUAL CALENDAR

Swiss watchmaker Hublot (named for its products' shape, using the French word for "porthole") has issued timepieces with unusual themes, like lines inspired by Ferraris, the bold colors of Pop Art, and Depeche Mode album covers. The chronograph is part of Hublot's ever-popular Big Bang collection, which celebrates its 10th anniversary this year. Priced at around **$67,000** in titanium and about **$85,000** in "king gold," it features a stopwatch, perpetual calendar, and moon-phase display. Adams says the watch is "an interesting marriage" of the traditional with the contemporary, "a very modern design and the aesthetics of the Big Bang."

6. BOVET AMADEO FLEURIER VIRTUOSO VII RETROGRADE PERPETUAL CALENDAR

Swiss watchmaker Bovet Fleurier is known for its 19th-century manufacture of pocket watches for the Chinese aristocracy. This convertible number goes from a wristwatch to a pocket watch to a table clock. A Salon 2016 novelty preview, the watch comes in rose gold or white gold. It has an alligator strap with an 18-karat gold ardillon buckle, and a chain comes in gold or rhodium-plated silver. Both sides of this watch display the time, presenting a simple and a more detailed view on a skeletonized, hand-engraved dial that includes the perpetual calendar, which is said to be precise for 400 years before it will need an adjustment.

The white-gold version is **$82,800**, or **$92,000** with a diamond-studded bezel. The brand's history with China is still evident today in details like those diamonds. According to Adams, there's still a really big focus on appealing to Asia: "So you have a type of watch that is focusing on Eastern tastes in case design and dial design but is functionally Swiss." ■

Looking for a Luxe Timepiece?

Here are six key factors to consider, according to Ariel Adams, luxury-watch blogger and author.

- **The inherent value:** "Can you assign value to the item outside of any marketing or brand recognition? Strip the label off: Is this watch still worth a lot?" says Adams. One simple way to determine that worth is whether it's made with precious metals or materials, such as gold, platinum, or diamonds.

- **The quality of its craftsmanship:** Consider the complexity and the time taken to produce the watch. Does it offer additional functions, such as a moon-phase display or a perpetual calendar? Is the watch produced via careful engineering, prototyping, and assembly?

- **The artistic value:** Luxe watches should be considered mechanical pieces of art, contends Adams. "Look at the application of the artistic technique: engraving, enameling, gem setting," Adams says.

- **Does it have a special pedigree?** Sometimes other intangibles are at play. Perhaps the timepiece was owned by a celebrity or a historic figure. Or maybe it is a one-of-a-kind watch edition. In such cases there's an exclusivity built in for an object that no one else is going to own.

- **Is it a big brand or a small, lesser-known one?** Without marketing muscle behind it, the small names typically don't command the same prices. They also don't usually have the same cachet or resale value. Smaller labels also come with a risk, according to Adams. "What if your watch breaks? Are they going to be around to service it?"

- **Is this a watch you'd actually want to wear?** Others may lust after this timepiece, but if you find it bulky, uncomfortable, or just not your style, think twice. "You should focus on the fact that any watch you buy is going to be included in your life," says Adams.

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Tech

PERSONS OF INTEREST: MASTERING BIG DATA

NOT BOXED IN

Divya Jain / Reshma Khilnani / Heidi Williams / Box

WHO: Jain leads machine-learning efforts; Khilnani manages the file-conversion team; Williams directs platform engineering. THINK OUTSIDE THE ...: These three engineering superstars drive technologies—predictive analytics, business apps, data storage—that help push the file-sharing company into new areas. "It's hard to see from a user's perspective," says Khilnani, "but there's a lot of depth behind the scenes." BOX POPULI: When they're not developing software, the trio is hard at work trying to crack another code: how to attract (and retain) more women in technical roles. SOAPBOX CIRCUIT: Williams sponsors the Los Altos, Calif., company's Women in Tech group, Khilnani organizes Girl Geek dinners, and Jain participates in the annual Grace Hopper Celebration of Women in Computing. "We still have a lot to do," says Jain, "but I'm not the only girl all of the time anymore." —*Michal Lev-Ram*

TICKER TAPE
A collection of curiosities

"We've been expecting it."
SOURCE: CRN

*Cisco CEO **Chuck Robbins** on Dell's takeover of EMC*

PHOTOGRAPH BY BRAD WENNER

Through a Glass Brightly

THE LATEST TECH-INDUSTRY PERK? INTERNET-CONNECTED WINDOWS THAT MAY BOOST PRODUCTIVITY—FOR A PRICE.

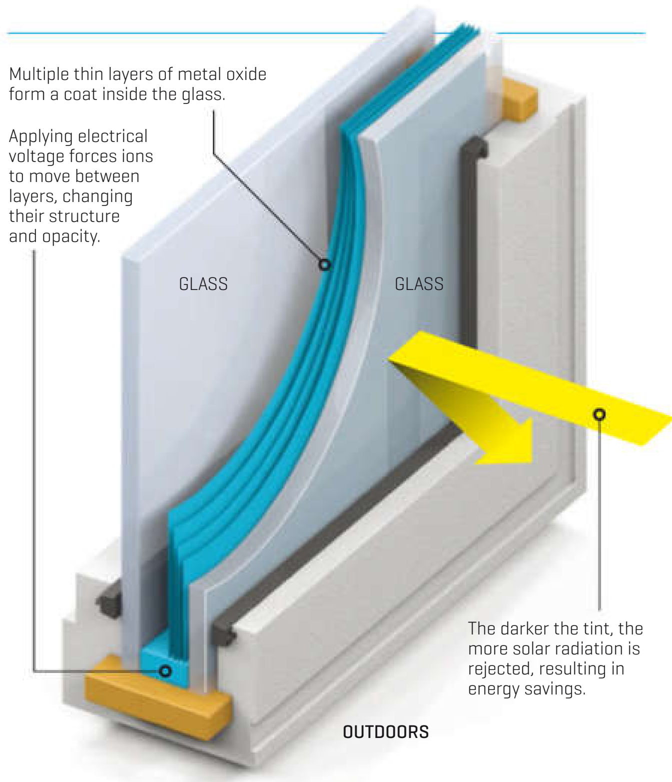
By Erin Griffith

OVERSTOCK IS BUILDING the hippest place to work in America. That's CEO Patrick Byrne's goal, at least. When the company's new Salt Lake City office, the "Peace Coliseum," opens next year, it will offer an extensive list of Silicon Valley–style perks: day care, a physician, a yoga studio, a massage therapist, and organic food grown on-site.

But the thing Byrne is most excited about is the view. The 230,000-square-foot office will feature a panoramic view of scenic Cottonwood Canyon. Rather than obstruct it with 40,000 square feet of blinds to shield occupants from the sun's glare and heat, the Peace Coliseum will make use of Internet-connected windows, or "smart glass."

Made by a Milpitas, Calif., startup named View, the electrochromic glass automatically adjusts its tint based on the sun or the worker's preference, courtesy of a jolt of low-voltage electricity. Light-sensitive glass is not a new concept, but View's Internet connectivity lets the windows communicate

Overstock's headquarters is called the Peace Coliseum for its Roman exterior and peace-sign shape.



LAYER EFFECTS

The glass's Internet connectivity allows View to learn occupant behavior and improve energy efficiency. Driven by algorithms, it can anticipate the sun's movement and adjust to incoming weather patterns.

with the building's heating and cooling system and enables occupants to control the windows' tint from a smartphone. (View has raised $460 million in funding; its most recent round was led by Corning, the 164-year-old glassmaker.)

Smart glass is not cheap. The upfront costs of installing it are 50% higher than for regular windows, View CEO Rao Mulpuri says, due in part to its added complexity. But the premium shrinks to less than 1% if you include savings on window coverings and cooling systems.

For Overstock, the cost is far outweighed by worker satisfaction. "Our annual payroll is $100 million," Byrne says. "If we can do something that makes people 2% more efficient, then that is worth $2 million." According to a 2011 University of Oregon study, workers whose offices were exposed to natural light took fewer sick days than those whose offices weren't.

"The things you can do to make people happier and more comfortable," says Byrne, "lead to dollar-and-cents benefits."

COURTESY OF OVERSTOCK.COM

$1.9 million *Proposed penalty against SkyPan International for unauthorized drone flights*
FAA

37% PROPORTION OF SMARTPHONE CUSTOMERS WHO OPT FOR LARGE (OVER 5 IN.) MODELS
J.D. POWER

GRAPHIC BY NICOLAS RAPP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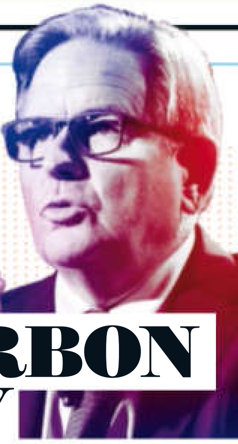
BRAINSTORM E SPECIAL

BRIAN O'KEEFE

ON A BIG RETAILER'S BIGGER GOALS

In September, Walmart said it would purchase 58% of the output of Pattern Energy Group's new 200-megawatt wind facility in Texas. It's a huge step toward the retailer's long-term sustainability goals, even as it tackles short-term performance issues. "We have to be able to walk and chew gum," said **Dan Bartlett,** head of corporate affairs, on the first day of Brainstorm E.

Miss this year's conference? Watch the highlights at fortune.com/brainstorme



THE ZERO-CARBON ECONOMY

BY BRIAN DUMAINE

Shell chairman Chad Holliday made news at Brainstorm E, held Sept. 28 and 29, by announcing the creation of a new commission to help the U.S. move to a zero-carbon economy. Why would one of the world's largest oil and gas companies want to decarbonize? Holliday argued that the U.S. needs to find ways to provide energy to a growing global population without damaging the environment beyond repair: "Shell believes society needs to be net zero carbon by the end of this century." He also stressed that fossil fuels will remain part of the mix with the help of, say, carbon-capture technologies. The new Energy Transitions Commission, whose members include Statoil, Dow Chemical, and GE, will act, he said, as a trusted source of information for leaders trying to make their countries and companies more sustainable.

KATIE FEHRENBACHER

ON NEXT-GEN BATTERY TECH

For the owner of a vehicle made by Tesla Motors, it's hard to think about the fact that your futuristic car could become obsolete. But that's exactly what happened in the minds of audience members when Sakti3 CEO **Ann Marie Sastry** took to the Brainstorm E stage to talk about her company's new solid-state battery, which promises to double a car's range for a lower cost than a standard (liquid) lithium-ion model. Tesla owners shouldn't fret too much, though. Sakti3's next-generation batteries will take years to land in electric cars, and the startup must rely on Tesla to spark electric-car adoption. In the meantime, look out for Sakti3's technology in future models of Dyson vacuums.

ON CLEAN-TECH INVESTING

"AMERICANS 'HEART' SOLAR. ELECTRIC-VEHICLE SALES ARE GOING UP. THE TIMING IS RIGHT TO MAKE NEW INVESTMENTS."

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At left, Ford's Soybean Car in development in 1940. Above, a 2015 F-150 on the assembly line in Dearborn, Mich.

FORD Goes Back to the Future

THE WORLD'S NO. 2 AUTOMAKER RIDES ITS ONGOING REVIVAL ON THE BACK OF MATERIALS-SCIENCE INNOVATION. IT'S A FAMILIAR STRATEGY. *By Sue Callaway*

HENRY FORD WOULD BE PROUD that his namesake company is leading the automotive industry's charge to work advanced materials into vehicles and high-tech systems into factories. It was the founder, after all, who in 1941 introduced the Soybean Car, the world's first plastic people carrier. The prototype didn't stand up to wartime priorities or crash testing. But it was ahead of its time, as modern materials science proves.

The automaker is the first to use a groundbreaking type of aluminum called Micromill, made by Alcoa. Ford first gained attention last year for making its most important vehicle, the F-150 pickup truck, entirely out of aluminum, which is lightweight but expensive and difficult to shape. Micromill—which debuted in some F-150 components in October—is thinner, stronger, and 40% more formable than today's automotive aluminum. Rivals like Audi and Jaguar have also invested in aluminum technology, but Ford's efforts put it at a scale that's difficult to match.

Ford also won the support of the U.S. Department of Energy to build a "multi-material lightweight vehicle" with auto supplier Magna International that would meet standard crash tests and other safety regulations. The resulting design, based on a Ford Fusion, weighed 23.5% less than a conventional model. "We worked on every material—steel, aluminum, magnesium, composites, plastics—to find the right solution for each component," says Matt Zaluzec, Ford's head of global materials and manufacturing research.

Driving much of the materials-science effort in the auto industry are looming deadlines to meet corporate average fuel economy, or CAFE, which mandate an average fleetwide fuel economy of 54.5 miles per gallon by 2025. A 10% weight reduction typically results in a fuel-efficiency gain of between 3% and 4%.

"It's not only about fuel consumption and emissions," says Steve Russell, a vice president at the American Chemistry Council, with which Ford is working on polymers. "Light-weighting also improves acceleration, handling, and braking."

The efficiencies don't stop at the vehicles. Ford has spent the past decade rehabbing its River Rouge Complex in Dearborn, Mich., where F-Series trucks are built, with new robotics, stamping equipment, chemical and heat treatments, and an aluminum-recycling system.

"Be ready to revise any system, scrap any method, abandon any theory, if the success of the job requires it," Henry Ford wrote in 1923. The maxim couldn't be more apt today.

FROM LEFT: COLLECTIONS OF THE HENRY FORD, GIFT OF FORD MOTOR; SAM VARNHAGEN—FORD MOTOR

"THIS MAY BE THE MOST IMPRESSIVE THING HE HAS EVER DONE."
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INVESTOR MARC ANDREESSEN ON JACK DORSEY BECOMING CEO OF TWITTER AND SQUARE

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A New Approach to Clean Water

MANOJ BHARGAVA, THE BILLIONAIRE BEHIND 5-HOUR ENERGY, SETS HIS SIGHTS ON A BIG PROBLEM: DESALINATION. *By Brittany Shoot*

Bhargava, 60, believes water is the world's next hot commodity.

ERIC EGGLY

IF RAIN DOESN'T ARRIVE soon, speculators will start taking bets on whether California can survive what has already been a devastating four-year drought. Many hope that El Niño storms will help replenish groundwater reserves. Relocating millions of people has been floated as a last resort.

But Manoj Bhargava prefers to make his bet—one worth an estimated $4 billion, thanks to 5-Hour Energy, his smash-success energy drink—on his own innovations.

Bhargava's bottled beverage is ubiquitous, but his name is mostly unknown. Yet for the past several years the self-effacing CEO has been quietly pouring most of his wealth into radical, home-brewed solutions

$305 BILLION PREDICTED COST OF CYBERATTACKS ON U.S. HEALTH SYSTEMS BETWEEN 2015 AND 2019
ACCENTURE

92.6% *Doctors who found their smartphone to be useful in helping them perform clinical duties*
BMJ INNOVATIONS

Rain Makers could, at scale, remedy California's drought.

through Stage 2 Innovations, his investment fund. Tucked away in a sprawling R&D facility in the tony Detroit suburb of Farmington Hills are solutions that, Bhargava says, will solve the planet's most pressing resource scarcities.

Take the Rain Maker, a desalination unit roughly the size of a flatbed truck that relies on a conventional power source to distill seawater into freshwater well beyond Environmental Protection Agency guidelines. A single Rain Maker can be placed in a town with a wastewater plant. In a crisis, hundreds could be stacked on an ocean barge to process seawater. Coastal desalination facilities typically cost billions to construct and require massive amounts of energy. Could the Rain Maker, produced at industrial scale, pull California back from the brink of disaster? The forecast looks promising. Regulators at the Brackish Groundwater National Desalination Research Facility, a testing facility administered in New Mexico by the Department of the Interior, have given it a stamp of approval.

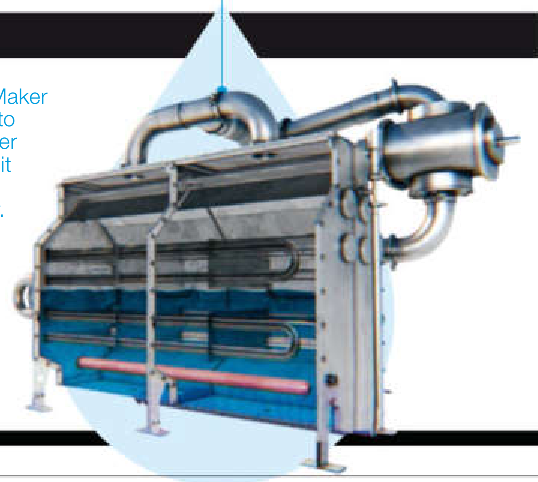
Bhargava, a Princeton University dropout and former Hindu monk, contends that complex solutions aren't necessary to solve the world's most pressing problems. "I'm not that smart," he insists. "[In the ashram] we were taught to think from a simple point of view. That training made all of this relatively easy." The Rain Maker and Bhargava's other potentially world-changing tools, such as a recumbent stationary bicycle that generates a day's worth of electricity in an hour of leisurely pedaling, have few moving parts and were designed so that nearly anyone can repair them. "We fish in the simple pond, whereas everybody else fishes in the complicated pond," he says with a shrug.

The Stage 2 team aims to put the Rain Maker into production by the first quarter of 2016. That's why Bhargava agreed to participate in *Billions in Change*, a documentary film spotlighting his work—to spread the word. "My job from here on out is to get this implemented," he says, "and to get politicians and environmentalists to work with us."

One thing he's not shy about? Plans to sell his technology for profit in drought-plagued California. (Bhargava is, after all, a businessman.) But he intends to use the profits to give Rain Makers to the poor in India.

"The purpose of business, in the end, is to serve society," he says. "I want to redistribute wealth in an intelligent way."

The Rain Maker uses heat to create water vapor that it distills into freshwater.



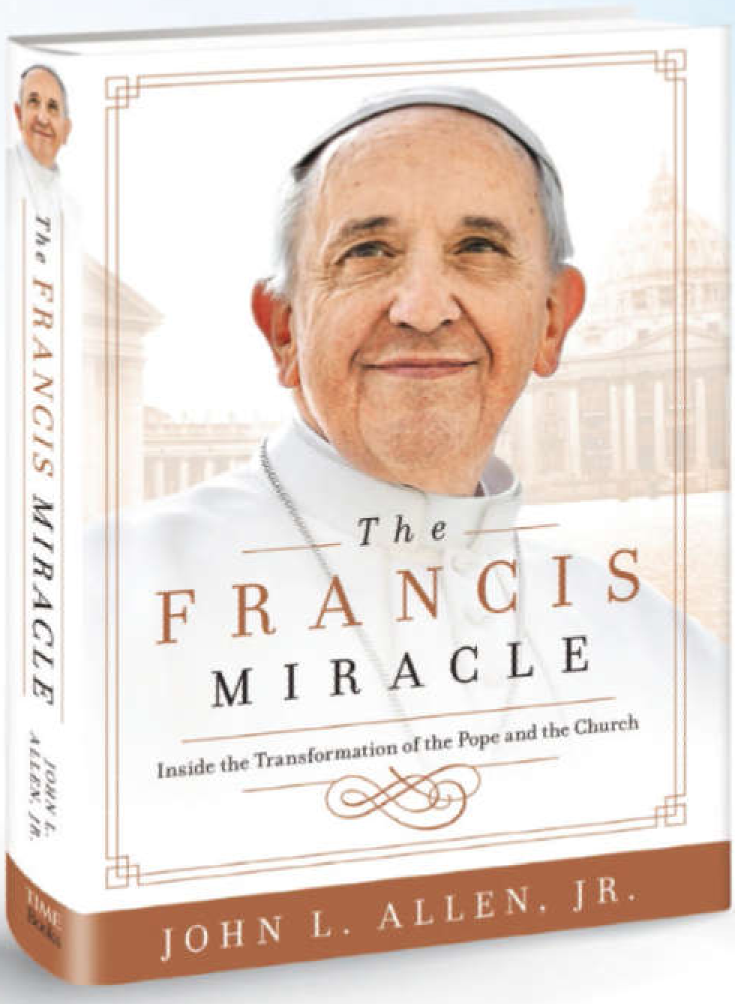
COURTESY OF *BILLIONS IN CHANGE*

$63.9 billion GARTNER — *Worldwide semiconductor capital spending predicted in 2015*

86 NUMBER OF FINANCING DEALS FOR "ON-DEMAND" STARTUPS IN THE FIRST THREE QUARTERS OF 2015 — CB INSIGHTS

Examples in Life and Leadership from Pope Francis

"*The Francis Miracle* is an excellent primer for those — conservative or liberal, religious or secular — who want to make sense of this pope as he progresses." – *Boston Globe*



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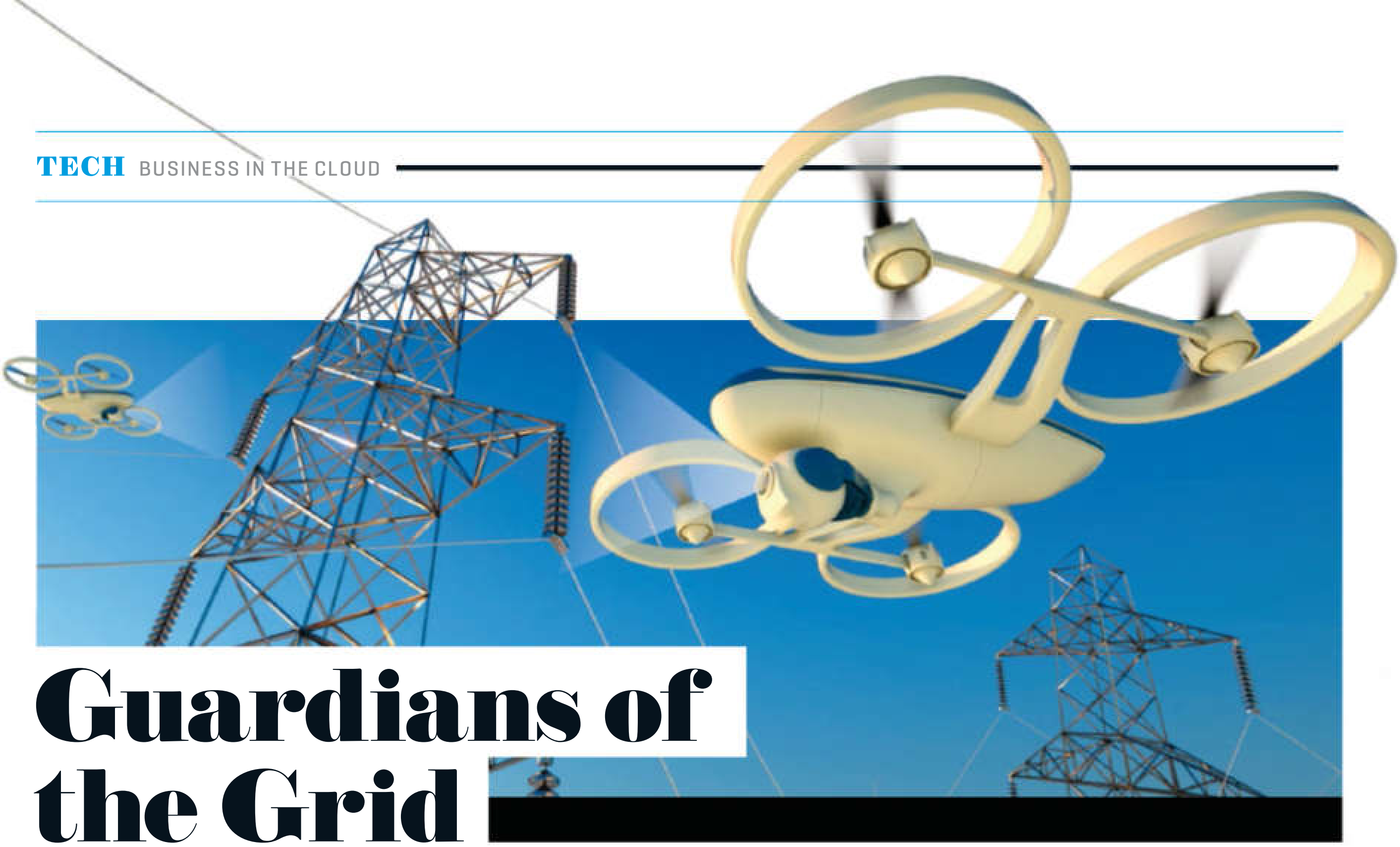

Guardians of the Grid

HOW DO YOU MAINTAIN ENERGY INFRASTRUCTURE THAT REACHES ACROSS A CONTINENT? GE THINKS A FLEET OF FLYING ROBOTS—PLUS THE CLOUD—CAN HELP. *By Jonathan Vanian*

I**MAGINE A SITUATION** in which a power line goes down in rural Mississippi. You see a drone fly onto the scene, snap a photo, and transmit that data to a utility worker in another location.

Pretty cool, right? The sudden emergence of the unmanned aerial vehicle—that is, drone—has given rise to a raft of alluring applications: military missions, farm surveillance, even package delivery (we're looking at you, Amazon). But consider the millions of miles of power lines strung across the globe—infrastructure on which we heavily rely to support our Information Age. Wouldn't it be wonderful and cost-efficient to use flying robots to help maintain it?

The world's power lines are linked by tall steel structures known as transmission towers. If these Eiffel Tower–shaped edifices are knocked down or damaged, whole sections of a country can go dark. In 2012 flooding and downed power lines caused by Hurricane Sandy led to major blackouts that affected more than 8 million people along the Eastern Seaboard.

But conducting routine maintenance on these transmission towers can be costly, time-consuming, and even dangerous for workers. All are reasons General Electric is exploring the use of drones to help with inspections, says Alex Tepper, GE's global director of innovation and the managing director of the company's venture capital arm, GE Ventures. With them, utility companies won't need to send human workers in helicopters or trucks to conduct manual inspections.

GE has several pilot projects with utilities in the works. The company is using fixed-wing drones, the kind that look like small airplanes, to inspect power lines in the U.S. and abroad. Tepper says a small drone can cruise along a line for about 15 miles before it must return to the person directing it. The robots capture images to spot, for instance, vegetation growing too close to the towers or tall trees that pose a threat to the lines in advance of severe weather.

And that's where cloud computing comes into play. A drone may be a useful appendage, but it's the software that serves as its brain. Linking it all together

"THE PAD HAS STOOD SILENT FOR MORE THAN 10 YEARS—TOO LONG."

BLUE ORIGIN

Jeff Bezos *on his decision to launch rockets from Florida* →

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Microsoft Cloud

is technology developed by a San Francisco company called Airware, in which GE has invested. The startup's software, which is built on the cloud platform developed by Amazon Web Services, makes it possible for a drone to plot destinations, generate flight paths, and wirelessly transmit data to a remote data center for analysis. In the case of vegetation, GE can crunch the numbers to assess the growth rates of foliage in proximity to the lines and see if and when it might risk damaging them.

Sales of drones, cloud technologies, and services related to utility-industry inspections will account for only $132 million in revenue for 2015, predicts Navigant Research. But in a clearer regulatory environment, that number will grow rapidly. By 2024, Navigant expects utility drone revenue to skyrocket to $4.1 billion.

A number of major utilities have expressed interest in using drones. Consolidated Edison in New York, San Diego Gas & Electric, and Chicago's Commonwealth Edison are all exploring their use, according to records and news reports. If robots prove to be more accurate and affordable than humans, Tepper asks, why not?

"With any new technology, people are very nervous in the beginning. That's fine. In the end drones are going to take off."

CHANGE YOU CAN BELIEVE IN

Andreessen Horowitz policy chief TED ULLYOT tackles the on-demand economy. *By Jeff John Roberts*

On-demand startups like Uber, which are built on the backs of independent contractors, keep colliding with regulators. Are their concerns founded?
A concept I like is "regulatory humility." Unless you can point to a bona fide clear risk, I think regulators should let new technology play out.

Your employer backs Lyft, which competes with Uber. It also invests in Instacart, which provides grocery delivery. Both companies are under fire from courts and labor groups. How do you see this ending?
I see it as an interesting balance between safety net and opportunity. You have policy proposals like a pooling arrangement, where companies in the "1099 economy" would somehow provide some contribution that goes to a pool that provides safety-net benefits for workers in this economy. The worst-case result is resolving these questions through class-action litigation. I would prefer it be resolved through policy debates rather than through the courts.

Where do you think the issue actually will be addressed?
I think it's going to play out at the state level, and also in the courts to some extent. Though if Uber gets that California class-action ruling reversed, it dramatically changes the landscape. It's unlikely you'll see much movement in Washington. We're so close to an election that I don't see a major move on this question.

Speaking of elections, is there a clear choice for President among those in the technology industry?
You'll find a hundred different opinions on that, even at Andreessen Horowitz. But we'd like to see someone pro-innovation and careful about not creating an environment in Washington that stifles innovation, Democrat or Republican.

You've been quoted in favor of Jeb Bush.
I'm obviously very loyal to the Bush family. I've worked [as deputy assistant to the President] for his brother and am a fan of the work Jeb's done in Florida in the past. His policies on deregulation and encouraging innovation are among the reasons I support him.

No vote for Donald Trump?
Trump would not be my candidate. I've yet to hear much enthusiasm for Trump anywhere in Silicon Valley. Let's just put it that way.

COURTESY OF ANDREESSEN HOROWITZ

63% *Asian manufacturers that say product innovation is their No. 1 priority*
IDC

24% COMPANIES USING ADDITIVE MANUFACTURING (A.K.A. 3D PRINTING) FOR MORE THAN JUST PROTOTYPING
DELOITTE

Tim McGraw has a challenge for you.

I've seen first-hand how diabetes impacts Americans from all walks of life. It's affected my family, friends and fans.

- Tim McGraw

Nearly 30 million Americans have diabetes – most have type 2 diabetes. That's why I'm speaking out about how important it is for those living with type 2 diabetes to get their blood sugar under control.

I'm encouraging all Americans to join me and challenge their family and friends with diabetes to get to their A1C goal.* I've learned that about one-third of adults living with diabetes are not at their A1C goal, which can lead to serious health problems over time.

Let's change that statistic.

If you have diabetes, take the challenge. Pledge to work with your doctor to set and reach your own A1C goal. Also be sure to learn if you are at risk of low blood sugar and how to reduce that risk. **

Join me now at **AmericasDiabetesChallenge.com.**

Together, we can make a difference.

American Diabetes Association.

America's Diabetes Challenge was developed in collaboration with Merck

* A1C measures average blood sugar (glucose) over a 2 to 3 month period.

** Low blood sugar (glucose), known as hypoglycemia, can make you feel shaky, dizzy, sweaty and sometimes faint.

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BEATING THE BREACH

CYBERTHREAT INTELLIGENCE IS EVOLVING DAILY.

VICTOR DE SCHWANBERG/ GETTY IMAGES

NOT LONG AGO, protecting corporate data was like safeguarding inventory in a warehouse. A few sturdy doors manned by alert guards were generally sufficient. But today, a company's inventory of data—more massive and valuable than ever—is often sitting on a public network. Unfortunately, most companies still focus on securing the warehouse, leaving themselves vulnerable to attack.

As companies utilize new technologies—from social media to cloud-computing systems—to improve operations and meet customer demands, cybercriminals are finding new ways to break into corporate data. Mobile networks, third-party applications promising to boost productivity, and a proliferation of mobile devices have torn open gaps in the traditional data warehouse, allowing attackers multiple ways in.

In 2014, almost 300 data breaches were reported by the U.S.-based Privacy Rights Clearinghouse, involving more than 68 million records. In the first three quarters of 2015, the group has reported only about 120 breaches, but the number of records exposed is already nearly double that of the first three quarters of last year—about 132 million. Rapid changes in modern communications are also putting data at greater risk. Gartner, a leading IT research firm, has estimated that by 2020 more than 7 billion people and businesses will be connected to the Internet using almost 35 billion devices.

"Now that we are becoming more connected online, the various devices and networks by which we connect them to the Internet are becoming primary targets for both criminals and nation-state attackers," says Davis Hake, director of cybersecurity strategy for Palo Alto Networks, a leading global cybersecurity firm. "We need to move away from traditional security models. We need to be proactive about trying to prevent attacks. If we're not focused on what we ultimately want to achieve and instead spend more time on responding to cyber events, we are going to be stuck in a futile cycle of chasing after attacks and data after the damage has already been done."

The source of cyber threats has also changed considerably. Cybercriminals include hacktivists, criminal organizations, terrorists, and nation-state

agents. "Now more than ever, the cybercriminals are more organized along the lines of structured campaigns and very targeted actions," says Vern Boyle, director of technology for the Cyber division of Northrop Grumman, the global aerospace and defense company. "The organizations we are talking about now are well resourced. They are very structured. The idea that this is just a lone hacker out there is just not a very good description."

In the most infamous recent attack, cybercriminals thought to be sponsored by North Korea spent about two months mapping the computer system at Sony Pictures Entertainment and grabbing massive amounts of data before revealing themselves in November 2014, posting embarrassing and costly data on the Internet. Along with demands for "monetary compensation," the attackers forced the delay of the movie *The Interview* by threatening violence. Sony has said the attack and the company's response cost about $15 million.

While credit card information remains a prime target for cybercriminals—in 2012 about $5.3 billion was lost to credit and debit card fraud in the United States alone—the Sony attack illustrates that data of all varieties can be vulnerable and costly if compromised. "The attackers are getting more and more creative with the things they can do with the data they take," says Hake. "It's not just credit card numbers. You really have to think about the data you put online and how that affects your cybersecurity risk."

In addition, many data breaches are no longer one-time, snatch-and-grab attacks, but are campaigns that last several years. Malware known as "retefe" has been targeting banks in Switzerland, Sweden, and, more recently, Japan since 2012. The attack begins with "spear phishing," an email with a malicious attachment. In a two-phase process, the attackers also infect mobile phones with a malicious application, allowing them to gain access to bank accounts and bypass security measures, such as SMS verification. At least 34 banks have been targeted.

Partly in response, Palo Alto Networks has established Unit 42, the company's in-house threat intelligence team that works to detect patterns and identify coordinated campaigns. Recently it identified Operation Lotus Blossom, an effort in Southeast Asia that spanned three years and attacked government and military networks. Hake said spear phishing was also the first action in these attacks, with malware allowing attackers to evade detection systems, gain access to command-and-control servers, and grab data. The key to

"You're constantly in the mode of whack-the-mole. We have to move toward preventing cyberattacks rather than hiding in the bunker."

Davis Hake,
Director of Cybersecurity Strategy,
Palo Alto Networks

JOHN LUND/BLEND IMAGES/CORBIS

preventing such attacks is not only responding as soon as a breach is discovered, he says, but also understanding "what they are looking for and how they are using it."

Cybercriminals have evolved at pace with advances in technology, and companies are struggling to keep up. Bank of America CEO Brian T. Moynihan said earlier this year that his cybersecu-

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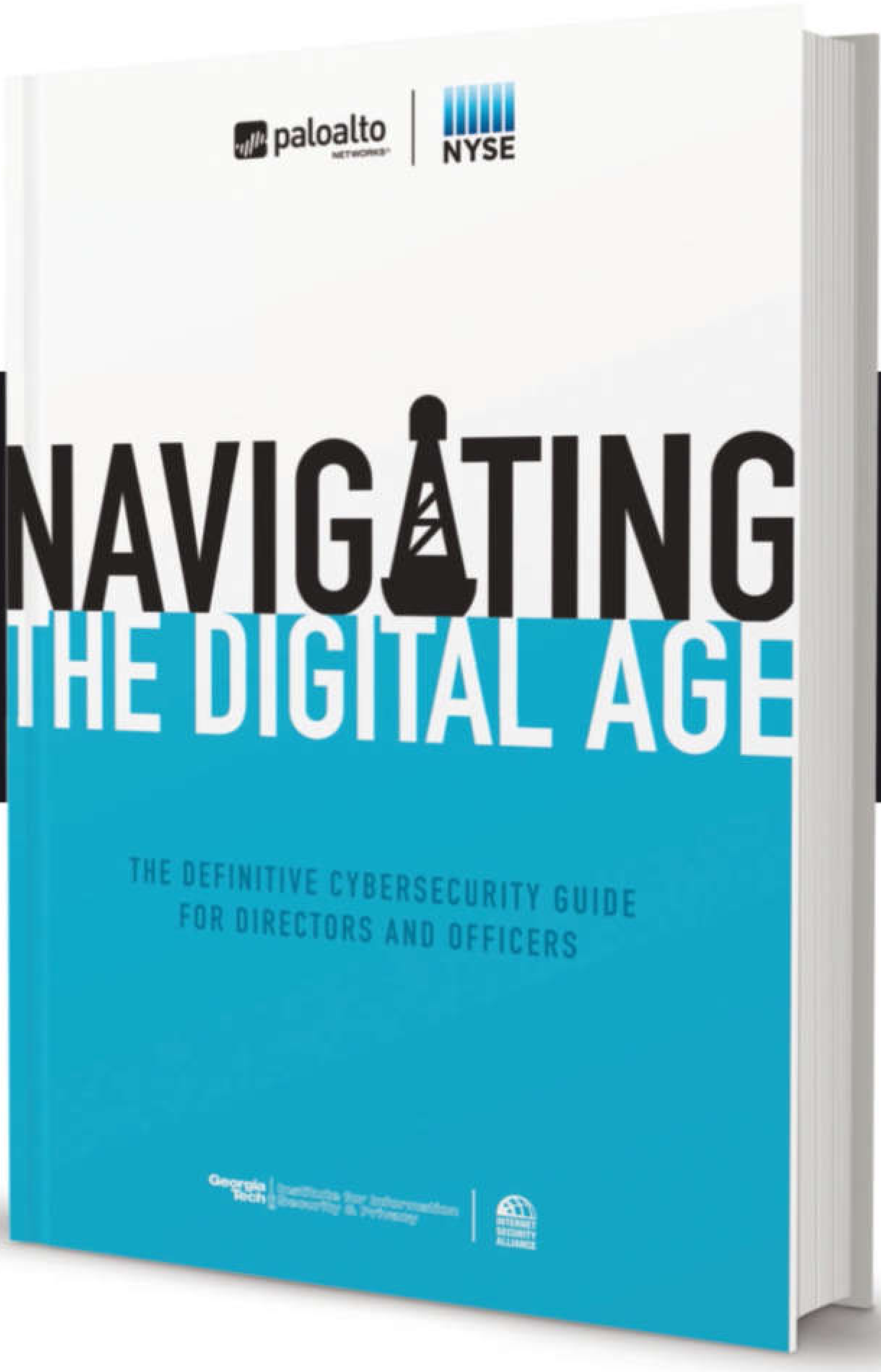
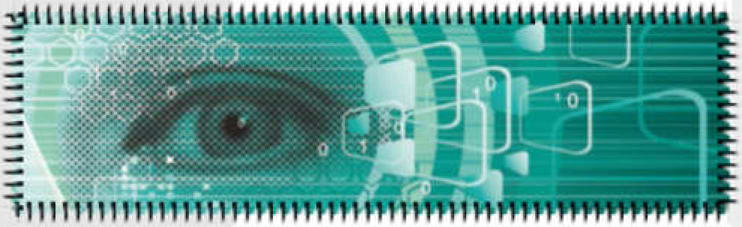


"The organizations we are talking about now are well resourced. They are very structured. The idea that this is just a lone hacker out there is just not a very good description." *Vern Boyle, Director of Technology, Cyber Division, Northrop Grumman*



rity unit has a blank check to protect the company's system, adding that the bank spends more than $400 million a year on cybersecurity. In contrast, malware used to grab credit card data from Target in 2013 is estimated to have cost about $2,000 when it first appeared on the black market. The cyberattack could cost the retail chain more than $100 million once all the claims are settled.

Confronted with the changing face of cyberattacks, security experts say that companies must reconsider legacy protection systems that lean too heavily on firewalls, with heavy-handed rules that, for example, don't allow employees to visit Facebook or tweet from company equipment. However, in today's digital world, some members of the marketing team, for instance, might need to access Facebook or Twitter for their jobs. "The old tools of the trade, like firewalls and anti-virus protection, are the tools of the past," says Boyle.

Other service-as-a-software (SaaS) applications, such as the sales productivity service Salesforce or the file-hosting service Dropbox, require that some employees access outside systems and data flow in both directions. Services such as Palo Alto Networks Aperture give companies the benefits of these applications, while reducing the risk. "Companies don't want just a 'yes' or 'no' on allowing access to an outside service," Hake says. "They want to take advantage of these new technologies and control them at the user and device level so business is enabled while reducing risk. Security is no good if it slows down your business and you end up turning it off."

Modern firewalls that are more discerning in allowing access while still scanning for threats are only part of the solution, experts say. Another part is to move from a reactive stance to more aggressive prevention-oriented measures based on understanding the entire life cycle of an attack. "You're constantly in the mode of whack-the-mole," Hake says. "We have to move toward preventing cyberattacks rather than hiding in the bunker."

The life cycle of a cyberattack kill chain follows the steps necessary for a successful breach. Individual versions of the life cycle vary, but it generally includes researching the target, accessing the computers, finding the valuable data, and taking or destroying that data. The cycle could be repeated indefinitely until the breach is identified and stopped.

Preventing an attack means breaking the chain at any point. An attack's research phase, for instance, might include gathering data on employees through social media to try to identify user passwords. Better training for employees on the risks of social media posts and on how to create strong passwords can break the chain here. Other measures along the life cycle include improved efforts to block access, and better encryption systems.

Boyle adds that automated protection processes are also needed to keep pace with attackers. One example is the Continuous Trust Restoration resiliency systems being developed at Northrop Grumman that, in essence, constantly restore systems to a known trust level. "The proliferation of devices, channels, and data has created an opportunity for any adversary to create a high degree of automation," says Boyle, "and as the infrastructure becomes automated, the adversary has taken advantage. Analysts can't keep up manually with increasingly automated threats."

Automated machine-to-machine information exchanges on cybercrime using protocols such as Structured Threat Information eXpression (STIX) also help keep up with attackers, Boyle says: "The underlying principal is that people can't beat machines in this domain. In order for us to keep pace, we have to implement a significant degree of automation."

Ultimately, countering cyberattacks will require a collaborative effort by companies, governments, and security firms. At risk are not just corporate balance sheets, but also the well-being of individuals who are often direct or indirect victims through embarrassing revelations or financial losses. Indeed, as the world's economy becomes more digitalized, an attack that undermines fundamental trust in the system could have far-reaching consequences.

"This would erode the trust in our digital way of life," Hake says, "and it's clearly not something we can afford." ●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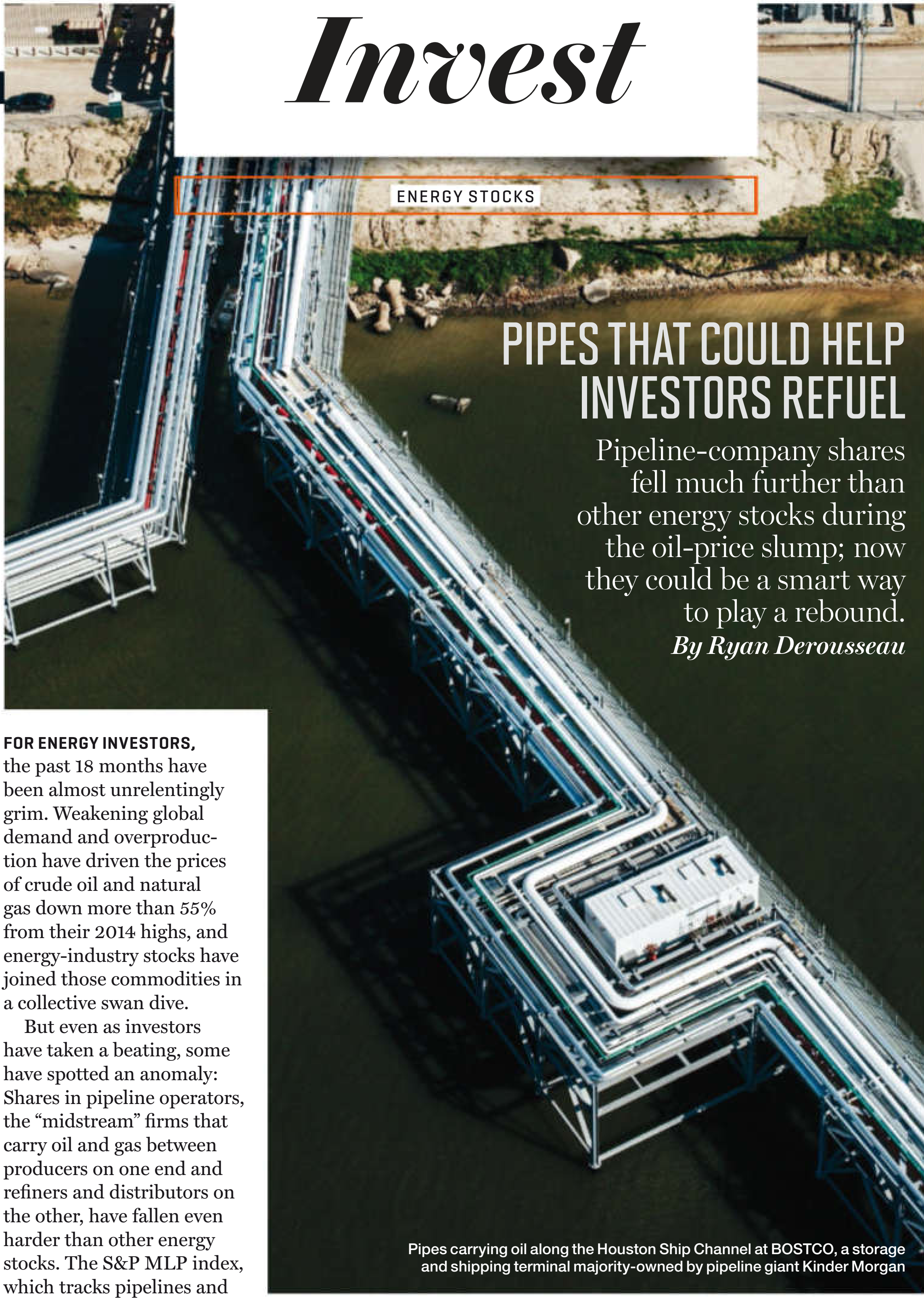


Pipes carrying oil along the Houston Ship Channel at BOSTCO, a storage and shipping terminal majority-owned by pipeline giant Kinder Morgan

PIPES THAT COULD HELP INVESTORS REFUEL

Pipeline-company shares fell much further than other energy stocks during the oil-price slump; now they could be a smart way to play a rebound.

By Ryan Derousseau

FOR ENERGY INVESTORS, the past 18 months have been almost unrelentingly grim. Weakening global demand and overproduction have driven the prices of crude oil and natural gas down more than 55% from their 2014 highs, and energy-industry stocks have joined those commodities in a collective swan dive.

But even as investors have taken a beating, some have spotted an anomaly: Shares in pipeline operators, the “midstream” firms that carry oil and gas between producers on one end and refiners and distributors on the other, have fallen even harder than other energy stocks. The S&P MLP index, which tracks pipelines and

PHOTOGRAPH BY BENJAMIN RASMUSSEN

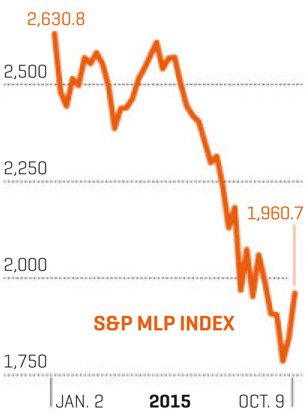
their operators, has dropped 26% in 2015, compared with 19% for the S&P index that tracks oil exploration and production companies. And that washout has given investors an opportunity to buy relatively big, stable companies at unusually low valuations—even as recent commodity-price moves suggest that the worst of the oversupply crisis may be over.

To some energy insiders, the pipeline plunge always looked puzzling. Pipeline companies usually lock in their revenue with long-term, fixed-rate contracts, so their income isn't heavily dependent on oil and gas prices. But the stocks of master limited partnerships (MLPs) and other midstreamers have suffered anyway, dragged down by what Global X Funds research director Jay Jacobs calls a "negative oil sentiment" that didn't reflect their underlying financial health.

It's true the industry faces long-term challenges. Suppressed demand discourages producers from drilling new wells, which "leads to less need for infrastructure," says Edward Jones analyst Rob Desai. Fewer new pipelines today, in turn, can mean slower long-term growth. But contemplating a post-boom future has prompted some midstream companies to alter their business models, while spurring consolidation—trends that could leave the surviving companies in better shape to thrive down the road. (In the biggest such deal, in September, Energy Transfer Equity announced it would buy fellow pipeline operator Williams Cos. for $32.6 billion plus debt and liabilities.)

THE END OF A SLIDE?

Stocks in MLPs and pipeline operators enjoyed a modest rebound this fall.



Interest-rate worries contributed just as much to these stocks' recent woes. Many pipeline operators are structured as MLPs, which frees them from tax liabilities but gives them incentives to distribute nearly all their profits to shareholders. MLPs have always been darlings of income seekers, and right now the stocks yield an eye-popping average of 7.1%. Still, fears that the Federal Reserve will raise rates soon have scared away many investors, says Adam Babson, manager of the Russell Global Infrastructure Fund. (Higher rates would make bonds, a less volatile asset class, look more attractive.)

Pipeline bulls counter that interest-rate risk is now fully priced into the stocks. They also find encouragement in recent history: The last time the Fed increased rates, between June 2004 and June 2006, the S&P MLP index rose 17%, beating the S&P 500's 12% gain. And Jacobs of Global X says the price-to-sales ratio of MLPs is now 0.8, compared with 1.8 for the S&P 500—the lowest level since 2010 and "an attractive entry point."

Brian Watson, senior portfolio manager of the $3.6 billion Oppenheimer SteelPath MLP Alpha mutual fund, applied that reasoning to **Magellan Midstream Partners:** He bought 330,000 shares earlier this year, even as its stock sank 16%. Magellan runs one of the country's largest refinery-transport operations, with a growing presence in Texas's Permian Basin, and Watson notes that oil's price plunge didn't hurt its ability to pay investors, as measured by "distributable cash flow." That figure was $456 million in the first half of 2015, an increase of 1.6% from the year-earlier period, and the stock has a yield of 4.1%.

The payouts from MLPs do come with a tax headache, however: They're taxed as regular income rather than at the lower rates that apply to dividends, and the paperwork can be onerous. Investors who don't have an accountant on call may prefer to own shares in pipeline management firms. These firms are often partners with or owners of MLPs, but they pay traditional dividends—and because they're not under pressure to distribute most of their profits, they can invest more in their businesses to spur growth.

To avoid tax hassles, some mutual funds and ETFs focus on these management companies, investing no more than 25% of their assets in MLPs. The **Global X MLP & Energy Infrastructure ETF,** which has annual expenses of 0.45%, is one cost-effective example.

Among individual companies, firms that manage natural-gas pipelines look particularly attractive to some managers. Calgary-based **Enbridge,** Canada's largest pipeline company, has been diversifying by expanding its terminals and storage facilities on the Gulf Coast, and it pays a 3.3% dividend. Another gas-focused operator, **Columbia Pipeline Group,** completed its spin-off from Indiana-based utility NiSource in July and has exposure to the huge reserves of the Marcellus Shale. Desai of Edward Jones says Columbia is in "quick growth mode," having committed $10 billion over the next five years to construction projects, and he estimates that it will increase its dividend by 15% a year through 2020.

Another potential winner is the industry's giant: Houston-based **Kinder Morgan,** a $70 billion company with an 80,000-mile pipeline network. Last year, Kinder Morgan began a reorganization in which it bought out its affiliated MLPs. While its price-to-distributable-cash-flow ratio, at 13, is higher than the industry average of 11.5, Kinder Morgan still offers a 5.8% yield. And its new structure and great scale should help it expand at a lower cost, says Desai—putting it in an enviable position if and when the energy sector recovers from today's lows. F

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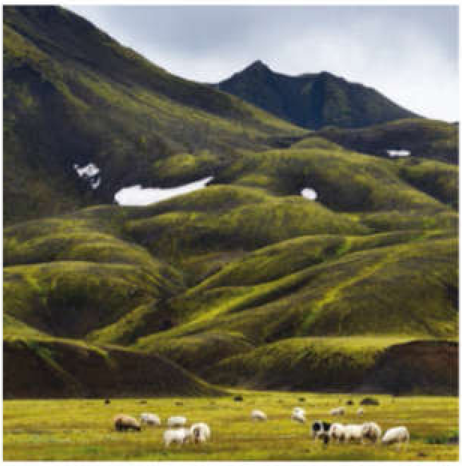

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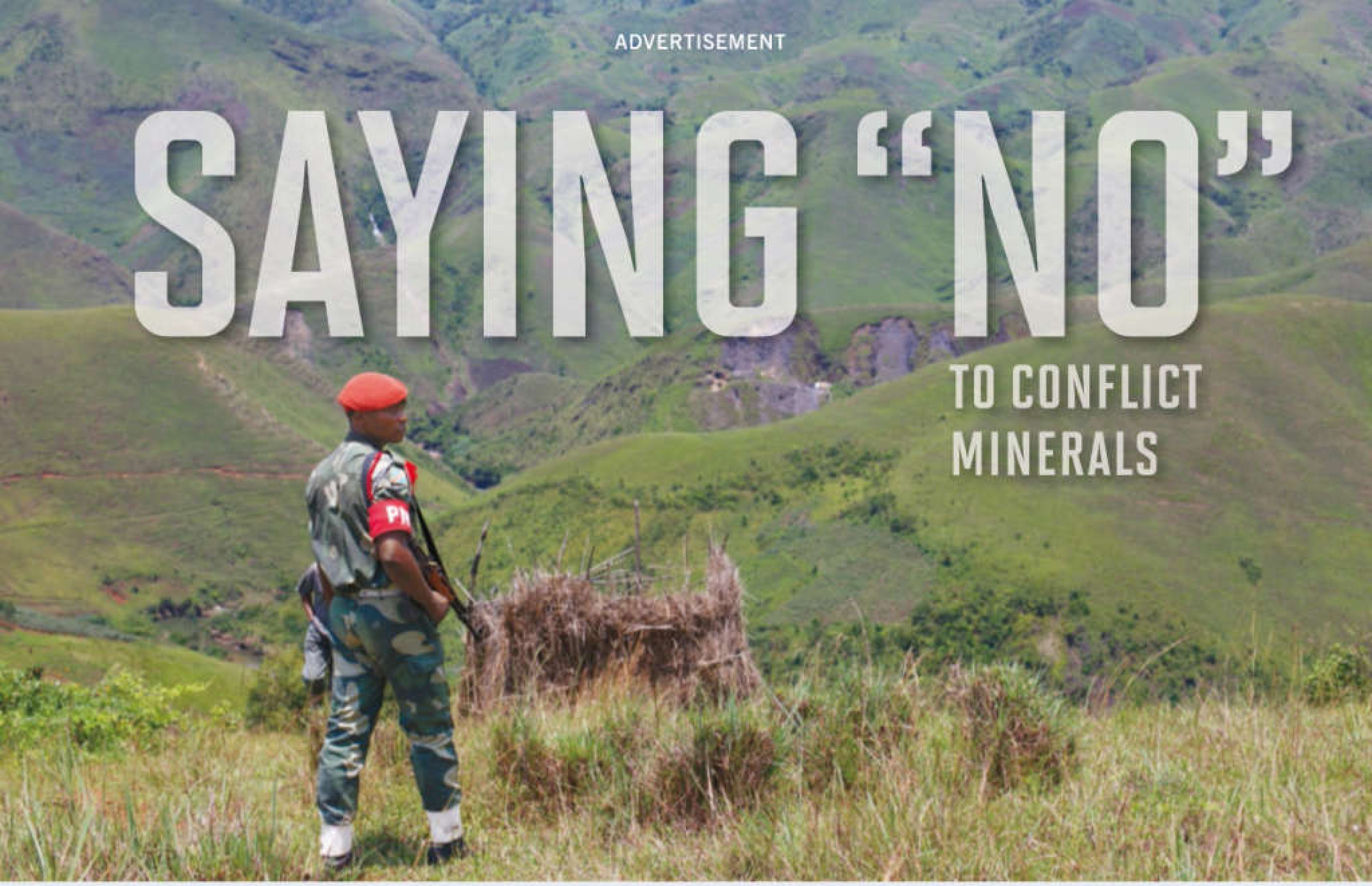


SAYING "NO" TO CONFLICT MINERALS

SASHA LEZHNEV/ENOUGH PROJECT

ELECTRONICS COMPANIES ARE HELPING TO START TO DECREASE THE POWER OF VIOLENT MILITIA GROUPS. HERE'S HOW.

UNTIL RECENTLY, you had no way of knowing if your laptop, cellphone, or jewelry helped finance armed militias in the eastern Democratic Republic of the Congo (DRC). This African nation is rich in gold, copper, cobalt, and tin, tungsten, and tantalum—the 3Ts—minerals used in a variety of products, including the chips found in most of today's electronics.

For years, armed groups have controlled many Congolese mines, selling these so-called conflict minerals to help finance their violent activities. This contributed to ongoing insecurity in the region, and miners and other civilians were cheated out of wages, abused, and even killed.

Now with the cooperation of NGOs, industry, and government agencies, that's beginning to change, says Sasha Lezhnev, associate director of policy at the Enough Project. Beginning in 2009, this Washington, D.C.-based nonprofit group, whose mission is to end genocide and other mass atrocities in Africa, engaged leaders in the electronics industry. The group informed companies including Intel, Apple, and Hewlett-Packard, among others, about what was taking place in the DRC and the role companies could play in helping end atrocities and build sustainable peace in the country.

Further pressure came in 2010 when the Dodd-Frank Act went into effect. Section 1502 of this legislation requires publicly traded companies to disclose to the Securities and Exchange Commission (SEC) the origin of their minerals and their due diligence practices related to identifying conflict minerals in their supply chains.

A DIFFICULT ROAD

If the process of creating a conflict-free minerals supply chain sounds daunting, few companies would argue the point. Carolyn Duran is the director of global supply management at Intel and the head of its conflict-free mineral efforts. She's seen firsthand how complex the process can be.

"Our first awareness [of conflict minerals] came from the Enough Project around 2009," she says. After hearing about what was happening in the DRC, Intel was determined to address the situation. "We certainly wanted to make sure that we weren't inadvertently funding violence, but at the same time there was no simple process to follow," Duran explains.

enough
The project to end genocide and crimes against humanity

"In fact, there was no process at all."

The first step was mapping out Intel's supply chain to find the smelters sourcing from the DRC. (Smelters convert raw minerals into the pure metals that eventually wind up in electronics, jewelry, and other consumer products.)

With such smelters identified as the "pinch point" of this effort, Duran and her team have thus far visited nearly 100 different smelters that are part of Intel's global supply chain to convince them to undergo audits certifying that their minerals are sourced from mines in the DRC not controlled by violent militia groups—in other words, conflict-free minerals.

According to an Enough Project survey in 2013, minerals from some mines that have not been audited sell for 30% to 60% less than those that have, reducing money flows to armed groups and the incentives for armed groups to take control of mines and engage in illicit minerals trading. The result of these efforts has been a significant reduction in the presence of armed groups at tin, tantalum, and tungsten mines in eastern DRC, as 70% of the 3T mines surveyed in eastern Congo are now conflict-free.

The journey has not been easy, says Duran, and many smelters early in the process were less than cooperative. But with more than five years of pressure, and the added push from other companies as a result of the Dodd-Frank 1502, progress is being made. Duran says Intel has roughly 250 smelters in its supply chain, and all but 40 are third-party-certified as conflict-free, or are in the process of going through a certification program.

In January 2014, Intel announced that its entire line of microprocessors would be made with conflict-free minerals, making it the first electronics company to do so.

Lezhnev says Intel's progress and that of other industry leaders effectively render the entire supply chain more transparent. "Companies can no longer source from the DRC and claim that they don't know what's going on," he says. Approximately 1,300 publicly traded companies use at least one of the four conflict minerals and are therefore required to report to the SEC.

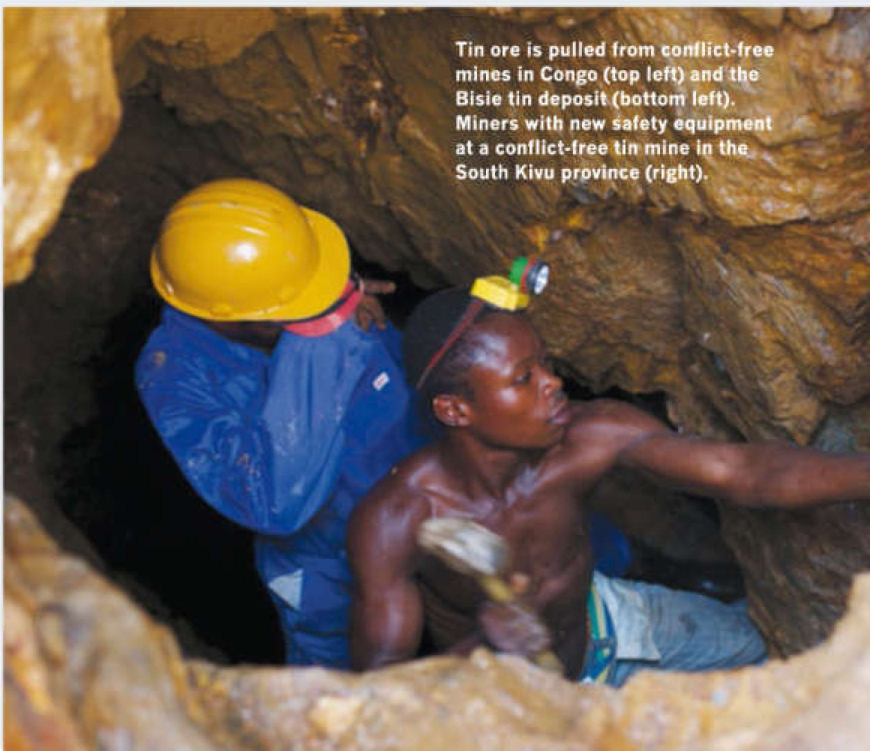
BROAD CONCERN

The attempt to promote conflict-free sourcing is not limited to corporate boardrooms. In 2010, the Conflict-Free Campus Initiative (CFCI) was formed. The initiative—part of the Enough Project—works to educate students about what's happening in the DRC and to persuade school procurement officials to pressure electronics companies to source from conflict-free mines.

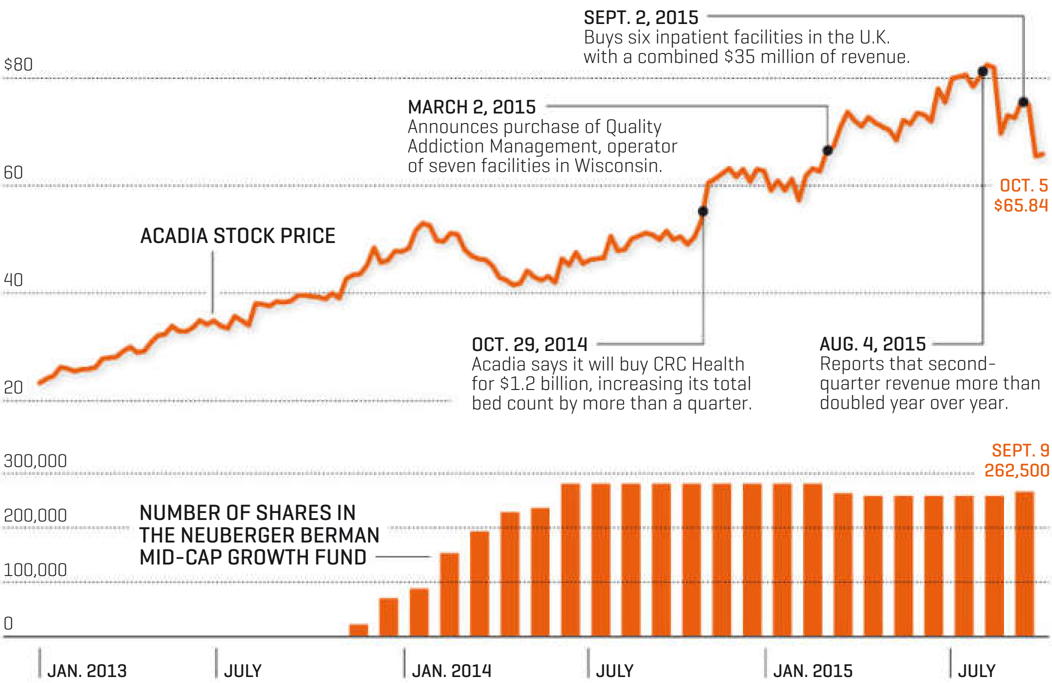
"Colleges and universities are big buyers of electronic equipment, and the students who use this equipment are an important customer base for these electronics companies," says Annie Callaway, senior advocacy associate for the Enough Project. "We want to use a school's power and voice to effect change."

So far, 175 schools have participated in the initiative, she says. Nineteen have implemented changes to their procurement policies to favor companies working to source conflict-free minerals from the DRC.

This is all a good start, says Lezhnev, and progress in the DRC can been seen. Currently, 141 mines there that are officially verified as conflict-free, and in some cases, he says, that's helping benefit miners working there. "We're also seeing other businesses, such as grocery stores and motorcycle taxi businesses, spring up in conflict-free areas," he adds. "It's slow, and there are still another 300 to 400 mines that haven't been certified, but it's certainly a step in the right direction. Reducing funding to armed groups and promoting conflict-free trade is one component of a larger approach to peace-building in the deadliest conflict globally since World War II."



Tin ore is pulled from conflict-free mines in Congo (top left) and the Bisie tin deposit (bottom left). Miners with new safety equipment at a conflict-free tin mine in the South Kivu province (right).



Thoughtful Play on Mental Health

Kenneth Turek has managed the Neuberger Berman Mid-Cap Growth Fund since 2002, handily beating the Russell Midcap index for the past 10 years. He likes companies whose executives "underpromise and overdeliver," and he thinks that applies to **Acadia Healthcare.** Acadia provides "behavioral health services"—inpatient and outpatient psychiatric care for people with mental-health and addiction problems. After a string of acquisitions, Acadia is now the biggest publicly traded pure-play company in this arena, one of health care's fastest-growing segments. Turek recently told *Fortune* why he's adding to his position.

By Lauren Silva Laughlin

NEW HEALTH CARE LAWS

In 2008, Congress passed the Mental Health Parity and Addiction Equity Act, requiring health plans and insurers to pay for treatment of mental illness and addiction as they would a broken leg or any other physical condition. Thanks in part to the law, spending on mental health and substance abuse doubled between 2003 and 2014, to roughly $240 billion. Congress is now considering a measure to increase reimbursements for similar services to Medicaid patients; if passed, Turek says, that could further boost Acadia's earnings.

MARKET PRESENCE

Acadia operates 232 facilities in the U.S., the U.K., and Puerto Rico, with a total of more than 9,400 beds. It has only one large direct competitor, Universal Health Services. When patients undergo mental-health crises, psychiatrists often recommend that they go to facilities like Acadia's rather than to a general hospital's emergency room. To pursue such referrals, Acadia deploys a network of relationship managers who meet with doctors regularly to "make the medical community aware of their capabilities," Turek says.

GROWTH PRICED RIGHT

Analysts expect Acadia to deliver earnings of $2.18 a share this year, up 42% from 2014, on $1.8 billion in revenue. Growth stocks in the health care sector fell further than the broader market during this summer's rout, and Acadia's stock is down more than 20% from highs it hit in August. The stock still trades at 24 times projected 2016 earnings, but Turek has taken advantage of the dip to scoop up more shares; he thinks that Acadia's growth prospects justify a valuation higher than those of less specialized health care providers.

EXPERIENCED MANAGEMENT TEAM

Staffing problems and patient-safety issues often crop up at for-profit mental-health facilities, and their operators face considerable scrutiny from regulators and consumer groups. In such a climate, experienced management matters, and most of Acadia's leadership, including CEO Joey Jacobs, has been on board since before the company went public in 2011. Turek says the team's experience shows in Acadia's efficiency: Facilities at Acadia are typically about 80% utilized. Turek also says management is deft at converting new facilities to the "Acadia way of doing business," as the company has been consistently accomplishing with its latest acquisitions.

GRAPHIC SOURCE: S&P CAPITAL IQ

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Forecasting Tomorrow's Cloud

New sharing platforms are allowing businesses to innovate more quickly, with more fluidity.

WHEN TECHNOLOGY PUBLISHER TechTarget last December asked experts what they thought would happen with the cloud in 2015, their answers were overwhelmingly similar: The cloud will continue to grow and see a tremendous influx of new tools and approaches to support integration and migration of applications and data. They also discussed the need for new security measures and the probability that the big vendors would be joined by smaller ones with new ideas.

They were right, according to the most reliable statistics.

For example, according to a Goldman Sachs study, spending on cloud computing infrastructure and platforms will grow at a 30% CAGR from 2013 through 2018. This is compared with 5% overall growth predicted for enterprise IT spending in this period, according to the firm. And Forrester Research is looking for similar growth, with cloud spending expected to shoot from $58 billion in 2013 to roughly $191 billion by 2020.

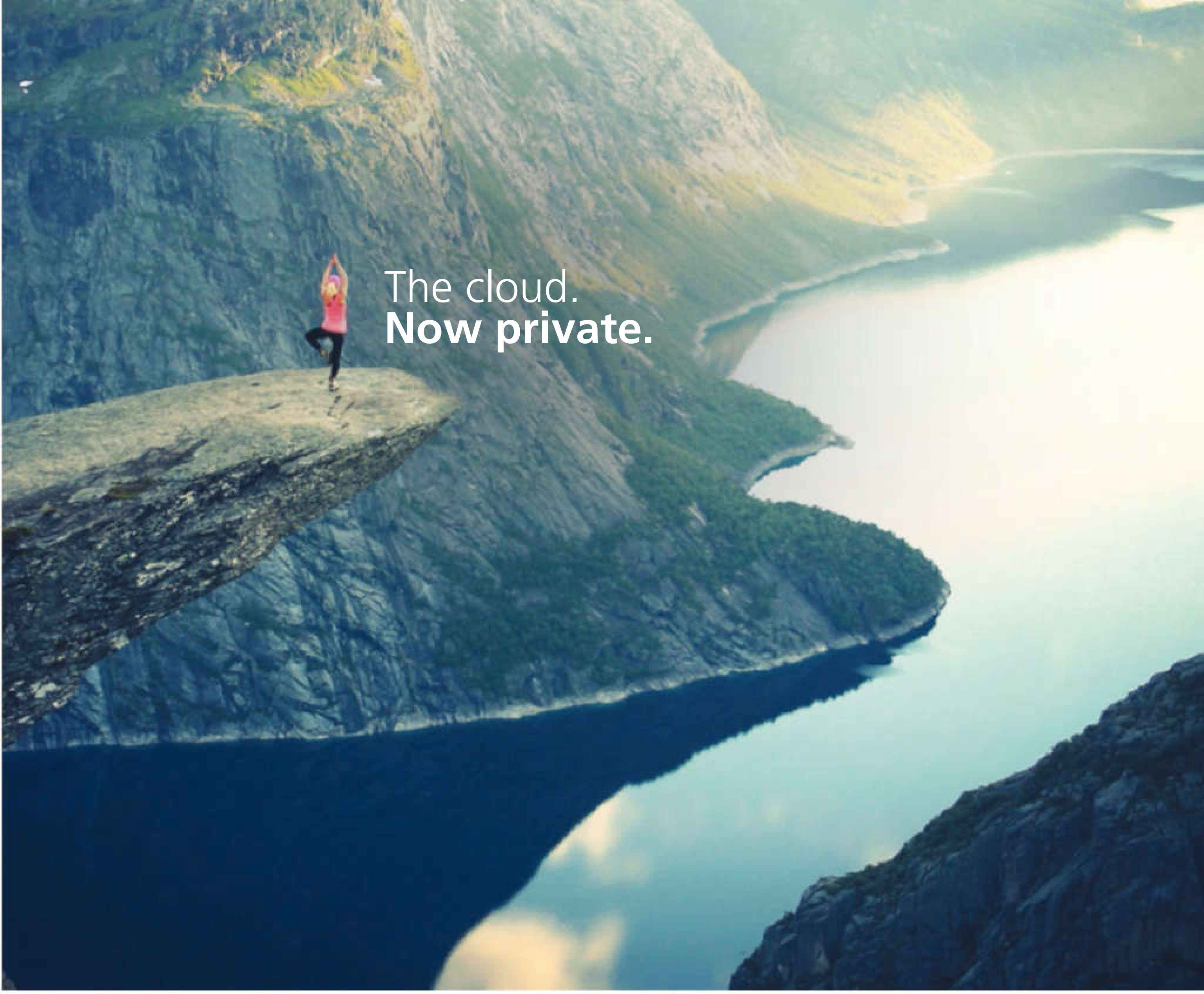
All of this growth comes from a single impetus, says Judith S. Hurwitz, president and CEO of Hurwitz & Associates LLC, a research and consulting firm focused on emerging technology: Companies are worried that they will be outpaced by the competition, so they are turning to the cloud as a platform for innovation and speed.

"The pace of business has just accelerated so much—I call it the Uber effect," she says. "Companies are so afraid of 'Who's going to be the Uber in my space?' What company is going to come along out of nowhere and leverage technology, and come to market, and basically totally change the way they have to do business? If that's going to happen, how can they respond in near-real time? This is what's keeping executives up at night."

WHO NEEDS A HAND?

According to Bob Renner, president and CEO of Liaison Technologies, a provider of cloud-based integration and data management solutions, such concerns are driving the development of new applications in the cloud.

"These new applications tend to be a little



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more granular, a little less heavy, compared to some of the monolithic applications that were sold as on-premises software. From our perspective as integration providers, this proliferation of lighter, easy-to-deploy cloud applications is placing a lot of additional stress on the requirement to connect systems and share data between discrete cloud applications," Renner explains.

Liaison delivers integration as fully managed services—a solution dubbed data platform-as-a-service, or dPaaS. According to Renner, dPaaS alleviates a significant burden that companies have long shouldered: maintaining in-house integration systems. These systems are expensive and unwieldy, putting flexible and responsive integration out of reach for many companies—especially today when data distributed across the cloud is harder to track, integrate, and manage, says Renner.

"By leveraging someone else's cloud infrastructure, and expertise, companies can focus their IT resources on initiatives that are more central to their missions," he says. Now organizations will have more time to analyze all the data pouring in from the new data sources the cloud affords, such as social media or the Internet of Things, providing new insights into a range of different businesses.

> "The next step is going to be when IT organizations realize that they literally do not want to be in the business of operating cloud workloads anymore."
>
> —**Charlie Burns**, *VP of Research, Saugatuck Technology*

Another area of technology that is expected to see big growth is managed services, says Charlie Burns, VP of research with IT analyst firm Saugatuck Technology, an ISG business. Companies understand the value of the cloud, but they don't want to have to migrate to the cloud on their own, or manage the data, workload, or applications on their own once they get there, he says.

"The next step is going to be when IT organizations realize that they no longer want to be responsible for operating cloud application workloads," Burns says. "They'll want to get out of that mundane but critical mission altogether. We see this trend in midsize enterprises that want IT to be strategic and are ready to hand off tactical management to a cloud provider."

It's a trend, he says, that will see companies such as Dimension Data—a $7.2 billion global IT solutions and full-service cloud provider that offers public, private, and hybrid cloud in 18 data centers on six continents—move into the spotlight. The company handles network integration, security operations, threat management, and converged communications, as well as related management and support services for its customers. Such capabilities stand to be highly sought-after in the future. "Since it saves companies money and allows IT departments to become innovative, rather than being merely supportive, IT executives will realize that this is what they need to do," says Burns.

Organizations can also leverage the cloud to provide better customer service. Contact centers are a good example: Today, there is often a disconnect between what customer service agents need to get their jobs done and the actual tools they have available. By moving to a cloud service such as Five9—a cloud-based provider with over 2,000 customers worldwide—companies empower their agents with the tools and information they need to excel. One Five9 customer reported a 300% improvement in agent productivity, which drove higher customer satisfaction marks.

GAINING THE ADVANTAGE

While the benefits of cloud—reduced costs, less maintenance and management, improved customer service, and better security—have been well documented, more important, says Hurwitz, is the fact that now companies can build something innovative more quickly. Even the approval process for new investment is easier, she says. "In the old days, if you were going to experiment with a new business model, or a new way to go to market or support customers, you would first have to go to an investment committee, submit a proposal

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for purchasing, and get approval," she says. "With cloud, whether it's internal or external cloud, companies now can do experimenting without a huge capital outlay."

Because the cloud lets people easily experiment—perhaps cloud's biggest advantage—they can take chances with promising new projects and ideas without having to worry that, if the project fails, their jobs are on the line. It creates a culture of innovation and allows every organization to think and act like a startup.

> "New applications tend to be a little more granular, a little less heavy and monolithic, compared to some of the big, large-scale applications that were sold as software."
>
> —**Bob Renner**, *President and CEO, Liaison Technologies*

"You can leverage data and some of the predictive analytics tools, and you can challenge an incumbent really quickly," agrees Hurwitz. "With cloud, companies can try out new business models. They can create an app and continue to change it and modify it, and add new capabilities as the business changes. That allows them to be a lot more inventive and to disrupt existing business models without shutting everything down."

Eventually, cloud will be so pervasive that it will cease to be thought of as the cloud, say experts. It will simply be computing.

"You'll see a lot more fluidity in computing," emphasizes Hurwitz.

In the article "The Cloud Corp." in our June 15, 2015 issue, we reported that Odin is located in Renon, Washington. It is located in Renton, Washington. For more about Odin, visit Odin.com.

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BY GEOFF COLVIN

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Cars bursting into flames are never a good thing.

So when a Tesla Model S ran over a metal object in Kent, Wash., in October 2013 and burst into flames, owners, potential customers, investors, and company executives got worried. When the same thing happened a few weeks later in Smyrna, Tenn., federal regulators opened an investigation. We all know what happens next: a massive recall, costly repairs at dealerships nationwide, and a painful financial hit to the carmaker.

Yet none of that occurred. The problem was that the Model S could lower its chassis at highway speed to be more aerodynamic, and if debris hit the car's battery pack in just the wrong way, it could catch fire. So Tesla beamed a software update to the affected cars, raising ground clearance at highway speed by one inch. The problem went away. Just four months after opening their investigation, the regulators closed it.

Using software and the mobile-phone network, Tesla avoided any need for a recall. It doesn't have any dealerships; customers can configure and order a car online, and they can test-drive cars at com-

Andrew Liveris

CEO : DOW

LIVERIS, ORIGINAL PHOTOGRAPH: CHRIS RATCLIFFE—BLOOMBERG VIA GETTY IMAGES

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PORTRAIT ILLUSTRATIONS BY **ERIC SCOTT PFEIFFER**

pany-owned showrooms. Tesla's advanced electric technology is simpler than gas or diesel technology, so cars can be built with fewer employees and less capital. Combine those factors and here's what happens: General Motors creates about $1.85 of market value per dollar of physical assets, while Tesla creates about $11. GM creates $240,000 of market value per employee, while Tesla creates $2.9 million. You don't get differences like that just by being more efficient. Tesla, though in the same business as GM, is a fundamentally different idea.

GM is changing, but for now it's still a 20th-century corporation. Tesla is a 21st-century corporation, built for sweeping new realities that change the rules of success. The big theme is the arrival of the long-heralded friction-free economy, a new world in which labor, information, and money move easily, cheaply, and almost instantly. Companies are forming starkly new, more fluid relationships with customers, workers, and owners; are rethinking the role of capital (as traditionally defined), finding they can thrive while owning less and less of it; are creating value in new ways as they reinvent R&D and marketing; and are measuring their performance by new metrics because traditional gauges no longer capture what counts.

Not all 21st-century corporations are glamorous Silicon Valley startups. They can be of any age and in any industry (even cars). Nike is a 21st-century corporation, aggressively reinventing manufacturing with 3D printing and cannily using social media for marketing. General Electric is becoming one, if partly as a result of shareholder frustration and outside pressure. Every company needs to be one.

The new realities begin at capitalism's foundation, capital. In a friction-free economy, a company doesn't need nearly as much as it used to. Consider the world's most valuable company, Apple. Unlike Google and Microsoft, the second and third most valuable firms, Apple gets most of its revenue from selling physical products. Yet the company says "substantially all" of its products are

THE BLOODSTREAM OF THE ENTERPRISE

New apps and cloud-based tools are turning far-flung workers into hives of collaboration—and connecting companies with their customers as never before.

IN ONE EPISODE OF HBO's hit television series *Silicon Valley*, the CEO of a Google-like corporation called Hooli tries (and fails) to use its latest invention, a hologram machine, during a meeting with his executive team. The future may be here, but it must first be buffered.

Technical issues aside, there is plenty of truth to the scene. Today's companies no longer confine their personnel to a central office to conduct business. With cloud-based tools available to send messages, store documents, host videoconferences, and refine ideas, it is now customary to see employees around the globe working with partners, customers, and one another throughout the workday—no headquarters necessary.

Distributed teams must devise new processes to keep everyone on the same page. At GitHub, an online code-hosting service based in San Francisco, 60% of employees are located elsewhere, according to vice president of product Kakul Srivastava. Individual teams rotate the times of their recurring meetings to "distribute the pain of odd time zones as much as possible," Srivastava says. But it's worth it. Embracing remote workers allows GitHub and other companies to hire the best people they can find.

Positioning employees outside corporate headquarters also means that modern companies are increasingly building their infrastructure outside their walls. Entire suites of critical business applications and services are now housed in the cloud and accessible by mobile devices.

"People want to be able to write down that idea from anywhere and are expecting people to respond to them from anywhere," says Scott Johnson, director of product management for Drive, Google's file-storage service. They also want that flexibility to (safely) extend to people outside the company.

But according to Rowan Trollope, who leads Cisco's collaboration technology group, the future holds something greater: "ambient computing," in which you can get to work using any number of Internet-connected, sensor-equipped devices—no phone number needed. Holograms? Has-beens. The 21st-century enterprise is everywhere.
—*Kia Kokalitcheva*

ILLUSTRATION BY STEPHEN CHAN

WHO NEEDS PHYSICAL ASSETS? More companies are creating high value with scant hard assets, even if—like Apple, Fitbit, J&J, and Tesla—they make tangible products.

MARKET VALUE PER DOLLAR OF PHYSICAL ASSETS

made by others. Because it can coordinate vastly complex global supply chains, it can pay those firms, mostly Foxconn, to make its products and get them where they need to be on time. Apple has even rented other companies' servers to host its iCloud service so that it can add or remove capacity easily, paying only for what it needs.

The U.S. government classifies Apple as a manufacturer, and with some 500 brick-and-mortar stores worldwide, its total capital—$172 billion of it, according to the EVA Dimensions consulting firm—is immense. But in traditional models it would need much more. Its achievement is using that capital to stunning effect, creating a market value of $639 billion. By comparison, Exxon Mobil uses far more capital, $304 billion, to create a market value, $330 billion, that's barely half as much as Apple's.

Those are companies that make and sell physical stuff. A friction-free economy also enables companies with virtually no physical capital to compete powerfully with capital-heavy incumbents. It's often observed with wonder that Alibaba is the world's most valuable retailer but holds no inventory, that Airbnb is the world's largest provider of accommodations but owns no real estate, and that Uber is the world's largest car service but owns no cars. Each has found ingenious ways to take friction out of its industry, connecting buyers and sellers directly and conveniently, enabling new, nearly capital-free business models.

But hold on—actually, those and all 21st-century corporations own tons of capital. Accounting rules just don't always call it that. There is intellectual capital in the form of software, patents, copyrights, brands, and other knowledge; customer capital in the form of relationships with buyers; and especially human capital. The 21st-century corporation, even if it makes or sells physical products, is above all a human-capital enterprise, which raises a profound question: Who really owns it?

IT WAS OBVIOUS long ago that law firms consist almost entirely of human capital, so it's illegal for them to sell stock to the public; outside stockholders couldn't own anything of value. Are consulting firms and ad agencies any different? Even companies that own valuable patents or brands may still get most of their value from human capital. What if the hundred smartest people left Starbucks or Johnson & Johnson or Walt Disney, or what if a crazed CEO tried to destroy each company's titanium-strength culture? In the 21st-century corporation, whether it's acknowledged or not, employees own most of the assets because they *are* most of the assets.

That reality is affecting corporate structure. The number of U.S. corporations increased only modestly and their revenues rose 150% from 1990 to 2008, says the IRS (using the most recent available data), while the number of proprietorships and partnerships, which are owned by their managers, increased far more, and their revenues rose 394%. The 21st-century corporation isn't always a corporation.

Jamie Miller

CEO : GE TRANSPORTATION

THE NEW RULES OF MANUFACTURING

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LISTEN TO YOUR MACHINES. Sensors can monitor operating conditions to improve performance and keep downtime to a minimum.

ARM PEOPLE WITH THE DATA TO MAKE SMART DECISIONS. Real-time dashboards give managers the information they need to constantly increase productivity.

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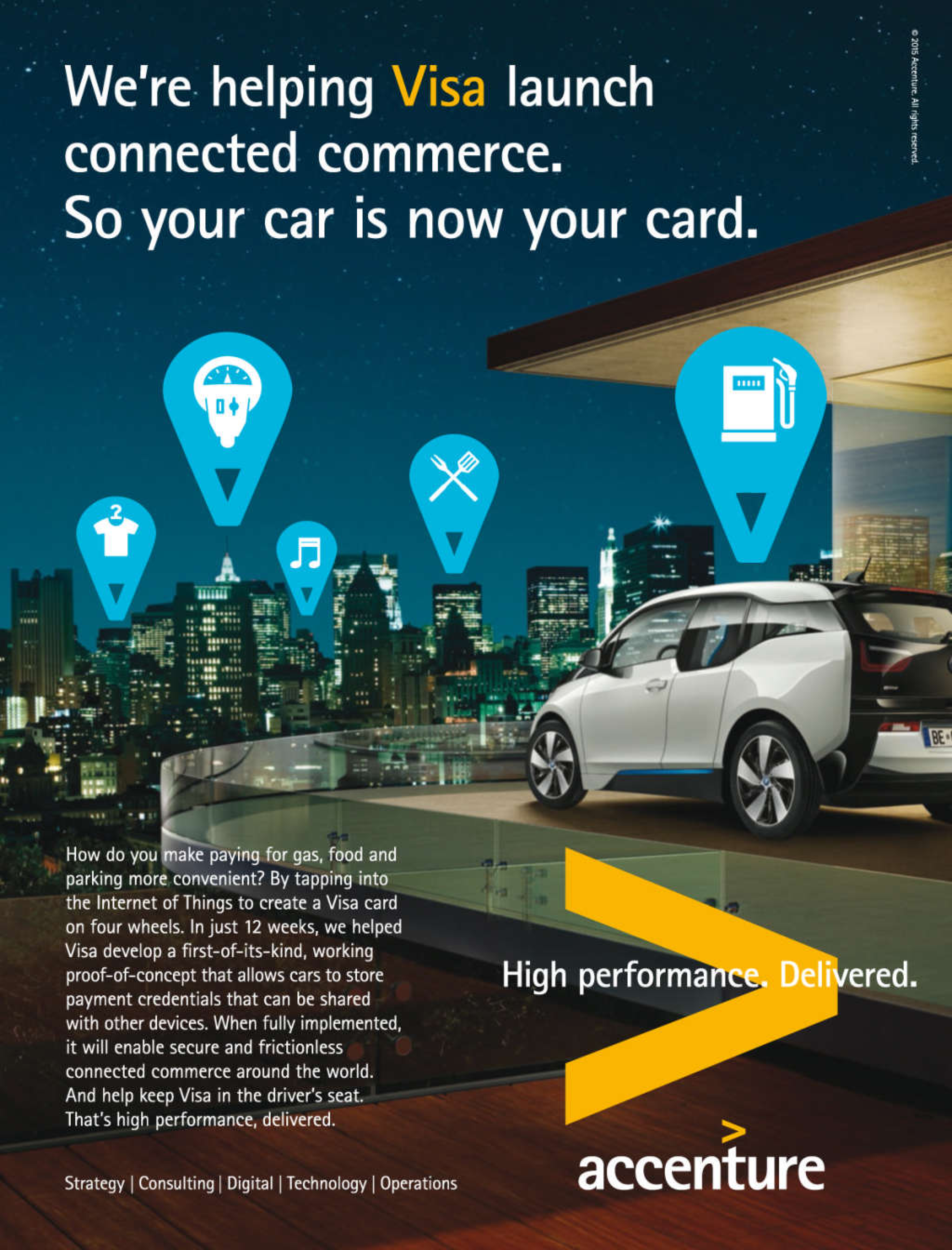
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So your car is now your card.
How do you make paying for gas, food and parking more convenient? By tapping into the Internet of Things to create a Visa card on four wheels. In just 12 weeks, we helped Visa develop a first-of-its-kind, working proof-of-concept that allows cars to store payment credentials that can be shared with other devices. When fully implemented, it will enable secure and frictionless connected commerce around the world. And help keep Visa in the driver's seat. That's high performance, delivered.
High performance. Delivered.
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Most businesses will have to create value in new ways or lose out to competitors that do so, often with Internet-enabled business models. The trend is as old as the Internet's early days, when a slew of web insurance upstarts forced term-life premiums to plunge 50% or more—and when user-friendly hotel- and airline-booking sites put some 18,000 travel agents out of business almost overnight. Now entrepreneurs are extending the trend into physical products in sophisticated ways. Warby Parker sells high-quality eyeglasses for a small fraction of what traditional retailers charge by using a low-friction online model; private investors recently valued the firm at $1.2 billion. Even an industry that seems highly resistant to online disruption, consumer packaged goods, is threatened. Harry's and Dollar Shave Club, which make and sell men's grooming products online, are forcing Gillette (owned by Procter & Gamble) to promote its wares on value, not just quality, for the first time.

The trend is especially frightening for even established category leaders because even if they switch to new, low-friction business models, they could still end up smaller and less profitable than they were. That's because "some tech and tech-enabled firms destroy more value for incumbents than they create for themselves, and many gains are competed away in the form of consumer surplus," says the McKinsey Global Institute. For example, Microsoft's Skype service brought in some $2 billion in 2013, yet McKinsey calculates that in that year Skype transferred $37 billion away from old-guard telecom firms to consumers by giving them free or low-cost calls.

Other new business models have similar stories. San Francisco's taxi regulator reported that the number of fares per licensed cab fell 65% from March 2012 to July 2014 as Uber, Lyft, and others entered the market. Uber—see our companion story in this package—is currently valued at $51 billion by its investors. Meanwhile, the cumulative market value of every New York City taxi medallion is less than $13 billion, as *Fortune* reported in September.

When Airbnb entered Austin, hotel revenue dropped 8% to 10%, say Boston University researchers, and "affected hotels have responded by reducing prices, an impact that benefits all consumers, not just participants in the sharing economy." Yet the new companies causing the disruptions collect only a fraction of what the incumbent firms lose.

The 21st-century corporation will increasingly be an idea-based business, operating not just in infotech but also in media, finance, pharmaceuticals, and other industries that consume lots of brainpower. McKinsey finds that while "asset-light,

THE NEW RULES OF LEADERSHIP

Tim Cook

CEO : APPLE

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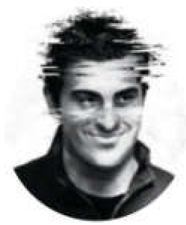


Brian Chesky

CEO : AIRBNB

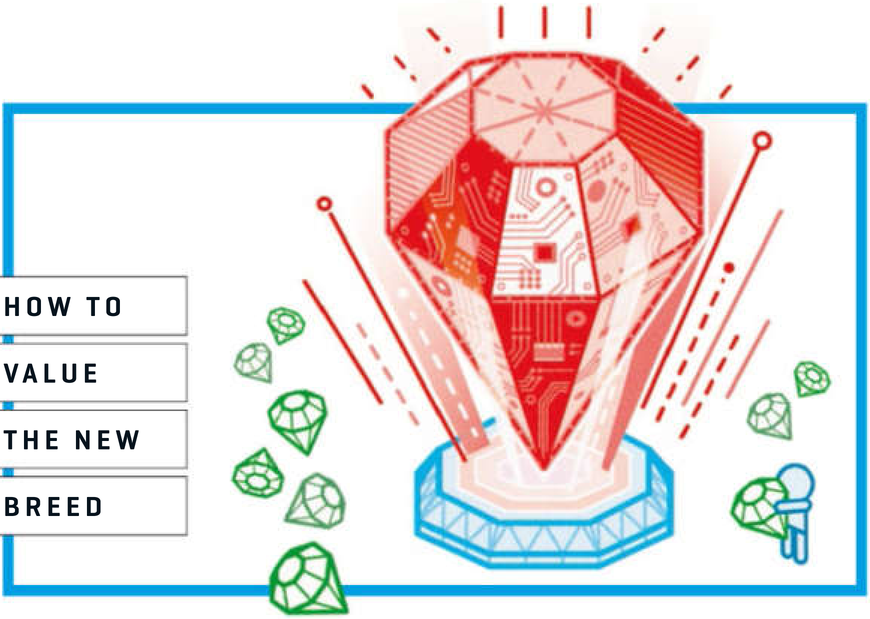
DON'T LEAD BY CONSENSUS IN A CRISIS. Usually in a crisis you have to go left or right, and everyone wants to go to the middle. And the middle is the storm.

Howard Schultz

CEO : STARBUCKS

IN THE AGE OF SOCIAL MEDIA ... The currency of leadership is transparency.

ORIGINAL PHOTOGRAPH, COOK: DAVID PAUL MORRIS—BLOOMBERG VIA GETTY IMAGES; CHESKY: SCOTT EELLS—BLOOMBERG VIA GETTY IMAGES; SCHULTZ: STEPHEN BRASHEAR—GETTY IMAGES



HOW TO VALUE THE NEW BREED

Few hard assets, no products to speak of, but intellectual capital aplenty. What's an investor supposed to do with that?

THE SO-CALLED UNICORNS, the fast-growing breed of 21st-century startups worth more than a billion dollars, have been so celebrated that it almost seems beside the point to ask, "Are they worth anywhere near their valuations?"

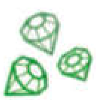
Fledgling student-loan provider SoFi recently raised $1 billion in equity at a valuation of more than $3 billion. Facebook paid $19 billion for privately held WhatsApp, a communications tool, before it had meaningful revenue. Uber, which has yet to report a profit, is worth $51 billion, per its latest private-market funding round. Disruptive or not, is there something that their backers are seeing that those in the rational investing world—they who assess companies on the present value of their future earnings—aren't?

It honestly doesn't matter. Private-market valuations are just that, the assessment of a small number of investors operating outside public scrutiny. Public-company valuations are tested every day that markets are open. The valuations of private companies shift only when they raise more money. In fact, says venture capitalist Keith Rabois of Khosla Ventures, "private-market valuations are more of an art than a science. They are a negotiation, with the venture capitalist asking, 'At what price will somebody who doesn't need my money take my money?'"

Several factors account for the abundance of venture-backed companies that have remained private well past the time they historically would have gone public. Low interest rates have made capital cheap and have encouraged institutional investors to seek superior returns in riskier bets. In turn, with so much available cash, private companies have been in no hurry to seek the glare of public markets. As a result, they are able to raise ever greater amounts at ever higher valuations.

Sometimes the eye-popping valuations aren't exactly what they appear to be. For example, in an effort to achieve billion-dollar status—resulting in positive publicity, bragging rights for recruiting talent, and ego stroking for entrepreneurs—some companies accept onerous restrictions in return for higher paper values. Payments-software provider Square, for example, raised money at a valuation of $6 billion while promising investors that an IPO price below an agreed-upon level would trigger the issuance of additional shares. This would dilute other shareholders—and possibly hurt the valuation of the company.

All this behind-the-scenes maneuvering eventually ends, of course, when companies finally go public. Already, tech companies like Box and Hortonworks have been unable to hold public values that exceed their previous private valuations. A unicorn, after all, is a mythic animal whose true value is in never being seen. Public companies have nowhere to hide. The new cohort may continue to innovate, but eventually they, too, will be worth only what money they can make for their shareholders over time.
—Adam Lashinsky



idea-intensive sectors" generated 17% of Western companies' profits in 1999, they generate 31% today. The losers in that shift are capital- and labor-intensive sectors like construction, transportation, utilities, and mining. That doesn't mean companies in those industries are doomed. As Tesla shows, they may be able to prosper if they're reimagined.

Or they can succeed if they redefine success. An intensifying source of pressure on companies of all kinds is the rise of competitors willing to sacrifice profits for growth. Frequently they are family-owned or state-owned companies that have achieved massive scale in emerging markets. For example, Alcoa's recent decision to split into two companies, a high-tech materials business and a commodity aluminum producer, was prompted in part by the cost advantage achieved by giant Chinese aluminum smelters; forced to compete with them, Alcoa's commodity business was dragging down the whole company. As emerging-market companies increase their share of global business—they're now about 30% of the *Fortune* Global 500—the profit pressure will increase.

Further pressure will come from another category of 21st-century corporations that sacrifice profits for growth, those that see vast territories to be grabbed in new-model businesses. Exhibit A is Amazon, which famously reports little or no profit quarter after quarter. Investors agree with CEO Jeff Bezos that the money is better invested in expansion; future profits will be that much greater as a result. The stock recently hit an all-time high.

ILLUSTRATION BY STEPHEN CHAN

THE APPLE CONTINUUM: Right, Foxconn employees on the line in Shenzen, China; below right, Apple Store workers in Tokyo cheer before the launch of the iPhone 6.

SOME OF THE DEEPEST RETHINKING to be done by 21st-century employers will follow from this question: What happens when the labor market becomes friction-free? It's clearly headed that way, as the rise of the gig economy shows. Companies still employ full-time workers who aren't really needed full time, but keeping them on staff is easier than constantly hiring and firing. At least it used to be. Now employers are hiring millions of workers worldwide to do information-based work through online marketplaces such as Upwork; each worker is rated by previous employers, and you don't pay unless you're satisfied with the work. While much of the work is routine, like language translation, a marketplace called HourlyNerd rents out former consultants and top business-school graduates to help with strategic planning, financial analysis, and other high-level tasks; customers are mostly small and medium-size businesses but have also included giants like General Electric and Microsoft.

Project the trend a few steps further, and the whole model of employment could change fundamentally. Employee-owned businesses are likely to increase, but they're just one option among many, which may eventually include a far more radical structure. Former Cisco CEO John Chambers said in June that "soon you'll see huge companies with just two employees—the CEO and the CIO." It's crazy, except that Chambers has a record of making crazy predictions (like opening your hotel-room door with your smartphone) that eventually come true.

Even employers that continue with plenty of employees will probably change the relationship. "It's possible to measure the outcome in almost any job now, so you can reward people accordingly," an executive of a performance-evaluation software maker told *Fortune* recently. As a result, top performers are being paid more, and the rest are getting less. Aon Hewitt reports that virtually all large employers now offer bonuses to regular salaried employees, often for achieving specific periodic goals like collecting more receivables or other performance metrics that are now easy to track. When individual performance was cumbersome to measure, pay was less differentiated and underperformers could keep their jobs. No more.

What's true for workers is true for the 21st-century corporation itself. As friction disappears and ambitious new competitors arise in emerging markets, underperforming companies can't hide. Winners will win bigger, and the rest will fight harder for what's left. Idea-intensive sectors "are developing a winner-take-all dynamic, with a wide gap between the most profitable firms and everyone else," says new research from the McKinsey Global Insti-

Aneel Bhusri

CEO AND CO-FOUNDER : WORKDAY

THE NEW RULES OF EMPLOYEE RELATIONS

BE TRANSPARENT TO ENGAGE YOUR EMPLOYEES. Communicate consistently about what's going on at your company and have mechanisms for getting real feedback—especially for millennials.

CREATE CAREER PATHS. Turnover is one of the greatest threats to growth. Provide your employees with opportunities to learn. If you do it right, your top performers won't be so quick to leave.

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FOXCONN: THOMAS LEE—BLOOMBERG VIA GETTY IMAGES; APPLE STORE: TOMOHIRO OHSUMI—BLOOMBERG VIA GETTY IMAGES; ORIGINAL PHOTOGRAPH, BHUSRI: BENJAMIN RASMUSSEN

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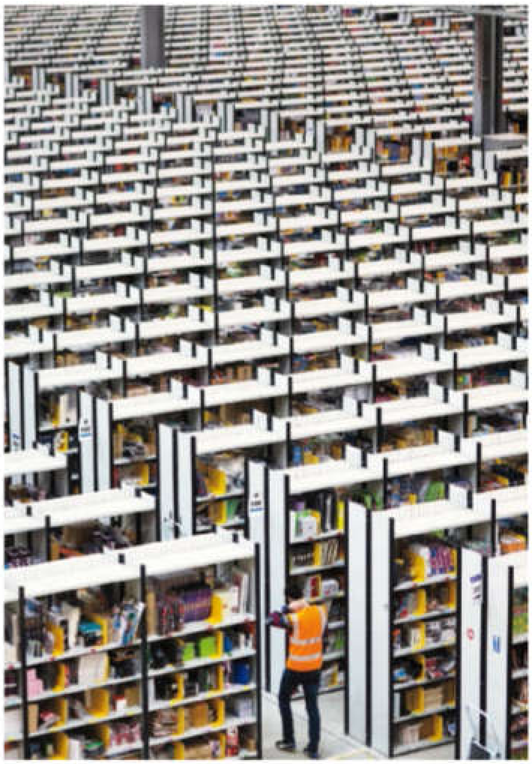

GROWTH BEFORE PROFITS: Amazon exemplifies companies that are willing to report little profit while they invest (as in this fulfillment center in Rugeley, Britain) in order to grow while opportunities are greatest.

SIMON DAWSON—BLOOMBERG VIA GETTY IMAGES

tute. More generally, competition is simply getting tougher. Global corporate profits recently totaled about 10% of world GDP, says MGI, a number we may someday recall with envy; the profit share could shrink to 8% by 2025, MGI predicts, barely more than it was in 1980. Result: "As profit growth slows, there will be more companies fighting for a smaller slice of the pie."

IT'S A WORLD in which corporations, though fighting ever harder, keep less of the global economy's output—seemingly the recipe for a declining role in world affairs. Yet for many 21st-century corporations it will be just the opposite. Some are achieving the scale of nations, a new phenomenon. Conducting billions of searches a day, Google possesses better real-time knowledge of what's going on in the world than any government does; research shows it can predict disease outbreaks, stock market movements, and much else, and could influence elections if it wanted to. With 1.5 billion users, Facebook has a bigger population than China does and can accurately describe its users' personalities and predict their success in work and romance. On any given day, Apple probably has more cash on hand than the U.S. Treasury. Bharti Airtel, an Indian telecom company, has about as many customers as the U.S. has residents. With 2.2 million workers, Walmart employs more people than any other organization on earth except the U.S. and Chinese defense departments.

And now one more mind-bending concept for the 21st century: Corporations, even as some achieve colossal stature, will on average live shorter lives than they used to. The trend is striking: The average life span of companies in the S&P 500 has declined from 61 years in 1958 to about 20 years now, says Yale's Richard Foster, who predicts further steady declines. Well before the 21st century's end, the concept of companies as continuing institutions could even cease to be the norm.

After all, why do companies exist? The English economist Ronald Coase won a Nobel Prize in economics for answering that question. In the theoretical world, the global economy spins like a top based on price signals between individual operators, with no apparent need for big companies. But in the real world, as Coase pointed out, "there are negotiations to be undertaken, contracts have to be drawn up, inspections have to be made, arrangements have to be made to settle disputes, and so on." That is, there are transaction costs—friction—and consolidating transactions inside companies is the most efficient way of handling them. Now, as technology shrinks those costs, many companies are unbundling themselves, outsourcing functions to others, crowdsourcing R&D, and exchanging employees for contractors. A continual Hollywood model, in which people and resources come together to achieve a goal and then disperse to other projects, may become common across the economy. It's happening already.

The good news is that accelerating change, creative destruction, and new business models are all opportunities for the venturesome. A unifying theme as the economy transforms is that in almost every business, barriers to entry are coming down. Opportunity is more widely available than ever. Every person and every organization can possess the 21st century's most valuable assets: openness to new ideas, ingenuity, and imagination.

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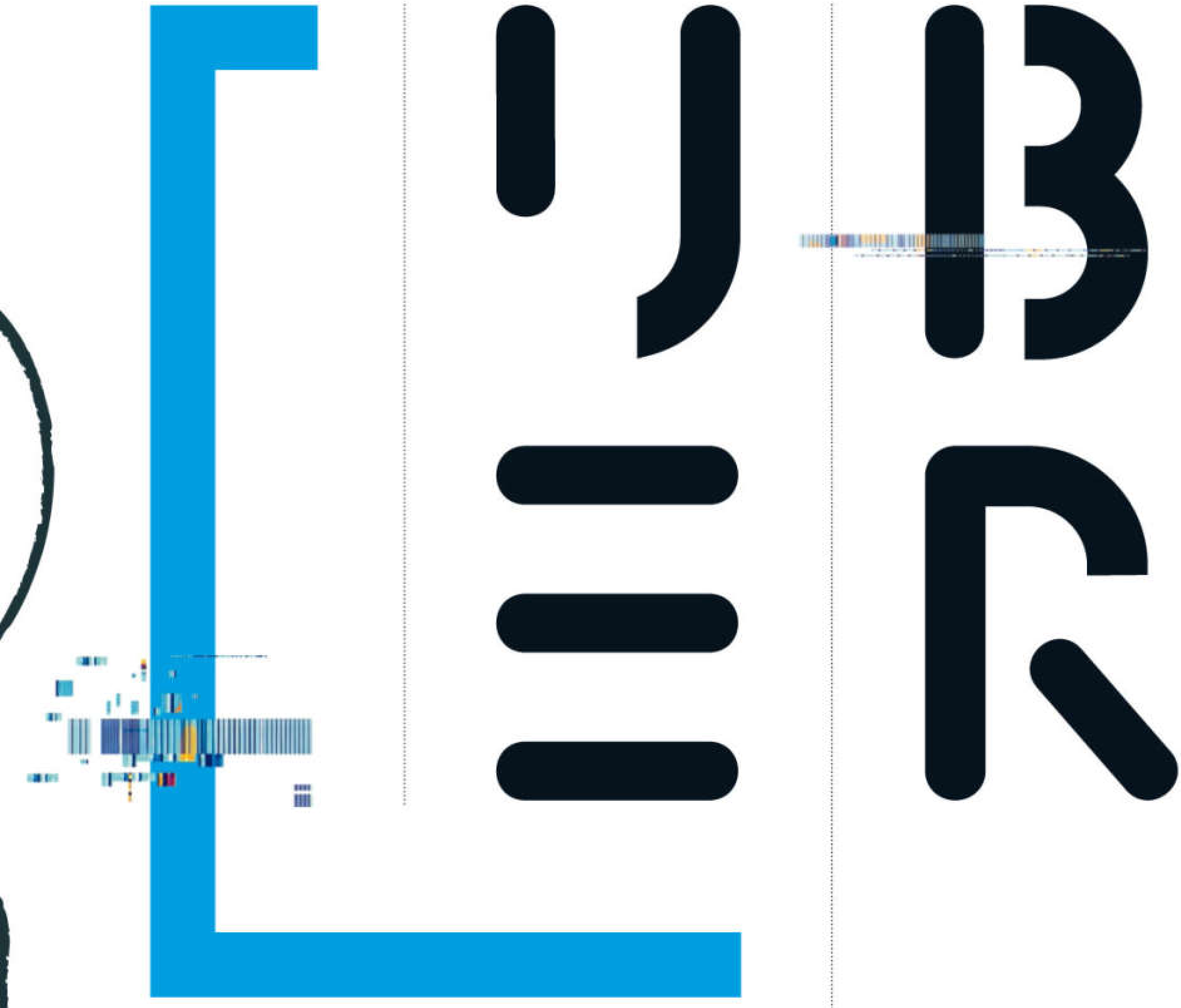


UBER'S TAX SHELL GAME

With a valuation of $51 billion and operations in over 60 countries, the car-hailing phenom is viewed by many as the model for the 21st-century corporation. What's less known is how leading edge Uber is when it comes to minimizing its tax bill. Here, *Fortune*'s in-depth analysis.

BY BRIAN O'KEEFE AND MARTY JONES

ILLUSTRATION BY
JUSTIN METZ

The VCs were desperate to give

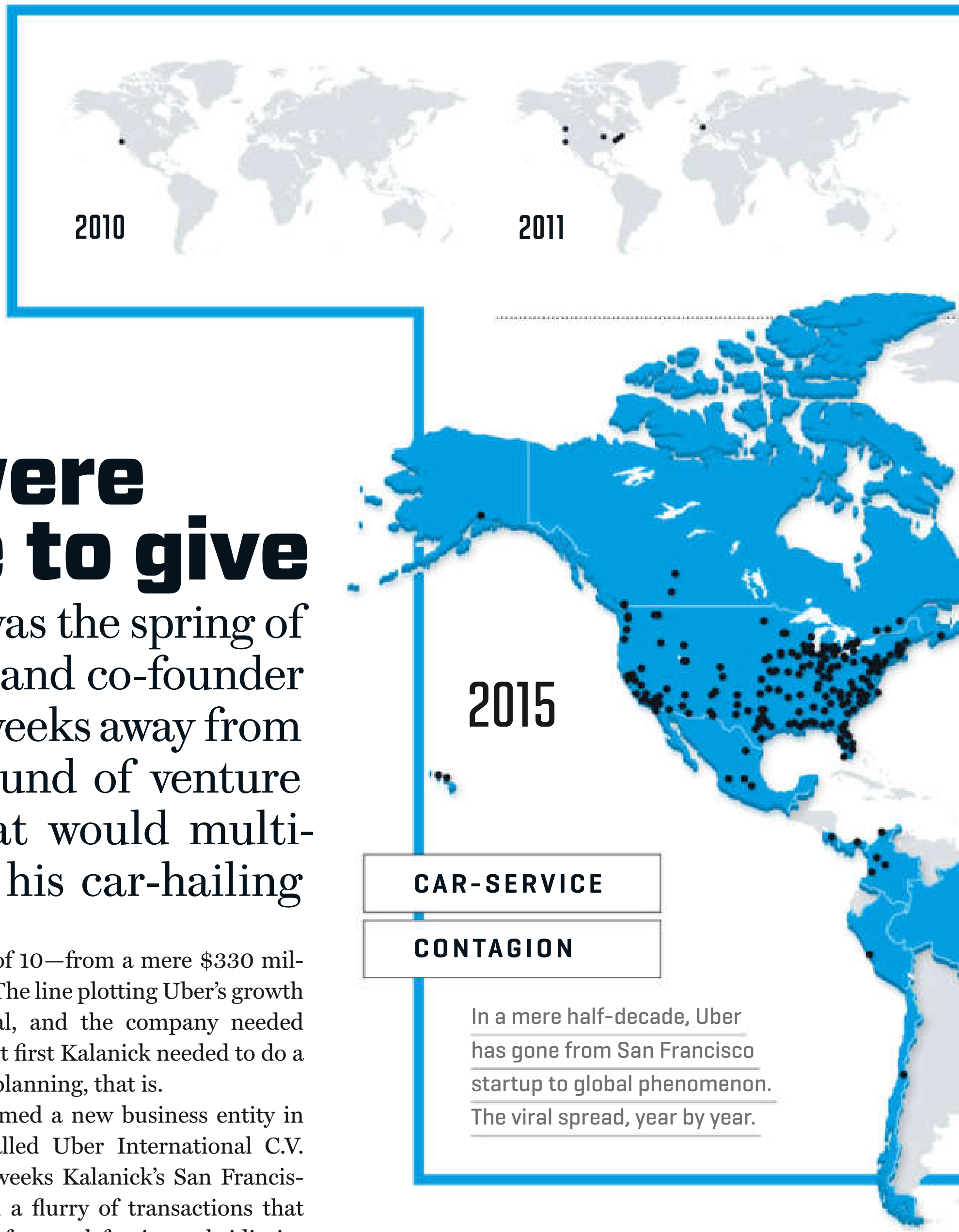
him more money. It was the spring of 2013, and Uber CEO and co-founder Travis Kalanick was weeks away from negotiating a new round of venture capital financing that would multiply the valuation of his car-hailing startup by a factor of 10—from a mere $330 million to $3.5 billion. The line plotting Uber's growth was turning vertical, and the company needed capital to match. But first Kalanick needed to do a little planning. Tax planning, that is.

In May, Uber formed a new business entity in the Netherlands called Uber International C.V. Over the next few weeks Kalanick's San Francisco startup executed a flurry of transactions that shifted ownership of several foreign subsidiaries to Uber International C.V. and formed an agreement with the Dutch business to split the profits from Uber's intellectual property. By mid-June, Uber was ready to continue with its dizzying rise, but with one critical difference: From that point on, nearly all its ride-share income outside the U.S. would be effectively shielded from U.S. taxes.

It was a crucial moment in the supercharged expansion of a company that has become emblematic of the dynamic, thoroughly modern global corporation—the centerpiece of the platform economy, the freelance economy, and a half-dozen other epoch-defining monikers. The startup has become so important so quickly that it's hard to see clearly.

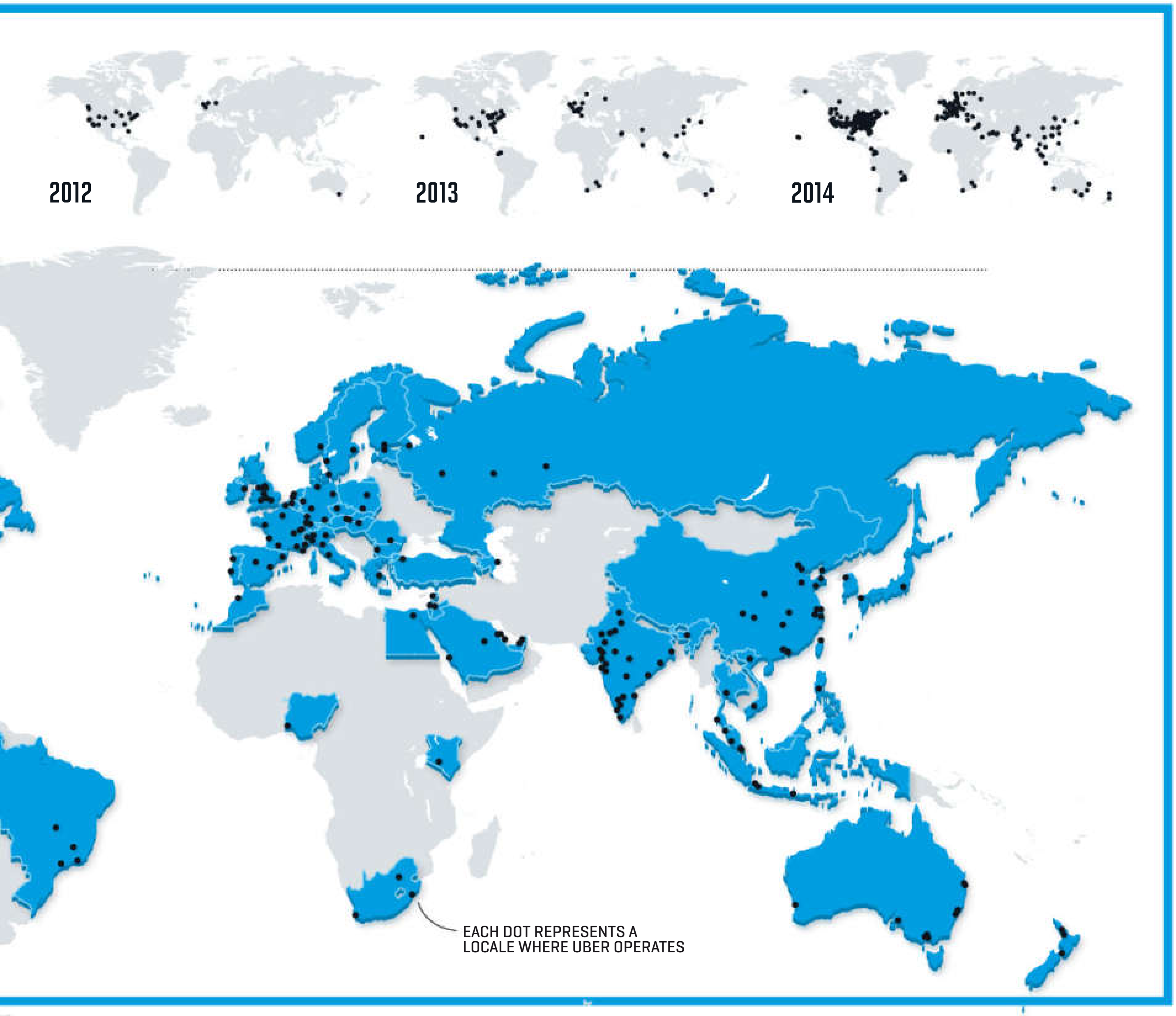
What is Uber? Ask any 22-year-old waiting for a car on a street corner in a fashionable neighborhood of Brooklyn or Chicago or London or Shanghai, and he'll tell you that it's an essential part of urban life—an effortless ride home after a night out. It's a status symbol, a utilitarian service, and a booming business all wrapped into one.

Already a well-established part of our cultural conversation, its name is regularly used as a verb—"Let's Uber it." And it's the representative ideal



CAR-SERVICE CONTAGION

In a mere half-decade, Uber has gone from San Francisco startup to global phenomenon. The viral spread, year by year.



for a whole new class of company: the "Uber of" phenomenon. Startups have been billed as the Uber of everything from helicopters to laundry to fertility clinics to parking. Perhaps no other company today inspires quite so much devotion—or anger. It's a vehicle on which people project their own dreams and biases. The name—which means "above" or "over" in German—is a fitting superlative to any beholder's eye. Love it. Hate it. Uber becomes the Uber of that emotion.

At its core, Uber is an app, a seamless smartphone tool for matching would-be riders with freelance drivers. It is also perhaps the ultimate 21st-century corporation (see the previous story for more about what sets this breed apart). Uber has become a global brand largely on the strength of its intellectual property and without a need to manufacture anything or maintain many fixed assets—though it now has more than 4,000 full-time employees. Moreover, it has grown at a pace that has roiled a ubiquitous legacy industry (taxis) and confounded government officials around the world—with an approach, epitomized by the brash Kalanick, 39, that comes across as all sharp elbows

MAP BY **NICOLAS RAPP**

MAN WITH A PLAN: Uber CEO Travis Kalanick has kept his company growing despite substantial resistance.

and legal gumption. "Stand by your principles," the Uber CEO once said of his philosophy, "and be comfortable with confrontation."

Just over five years after it began offering rides in San Francisco, Uber now operates in 342 cities spread across more than 60 countries. It's the poster child for the so-called sharing economy, employing some 327,000 freelance drivers in the U.S. and hundreds of thousands more around the world. And it is the biggest of the "unicorns" (private tech startups with a valuation of at least $1 billion) that have recently sprung up all over Silicon Valley and beyond. In Uber's most recent round of financing, investors assigned it a value of $51 billion—a milestone it reached faster than Facebook had before it. That means it's worth more on paper (or on someone's paper, at least) than, say, U.S. retail giant Target, which had $74.5 billion in sales in 2014 and has a market cap of just $47 billion.

Ask Uber's investors or the Wall Street investment bankers clamoring to take it public and they'll tell you that it's destined to be one of the world's most important companies and that it will soon (perhaps in 12 to 18 months) be the market's next marquee IPO. According to a recent report by Reuters, Uber has told prospective investors that it will reach $10 billion in global ride payments this year—giving it $2 billion in revenue when it takes its 20% cut. It projected those numbers, the Reuters report says, to more than double in 2016.

Such figures speak to Uber's extraordinary growth trajectory, which is clearly the company's focus now (as it is for virtually all the unicorns). Its investors want it to keep grabbing market share and not worry about generating profits. Those can come later.

While it primarily offers car rides today, there is the suggestion that Kalanick's brainchild may one day be much more. With its UberRush service, the company has experimented with delivery. There is even speculation that it could end up being the company that dominates the driverless-car revolution. Kalanick himself has described Uber as a new platform to help replace inefficient 20th-century transportation systems.

Many of the car-hailing company's freelance drivers around the world might describe it as a flexible and empowering employer. But the small band of Uber drivers in the U.S. who recently called for a three-day strike or those who have filed a class-action lawsuit against the company in California seeking full employee benefits (and challenging the company's contractor-based business model) would certainly beg to differ.

Taxi companies and critics the world over portray Uber as a reckless and dangerous operation that puts unregulated drivers on the road with passengers and doesn't pay its fair share of taxes to support the infrastructure it needs to exist. The Australian Taxation Office has attempted to impose a sales tax on Uber rides. Local officials in Rio de Janeiro and São Paulo have taken steps to ban the service. The company's office in Amsterdam has been raided twice in 2015 by authorities investigating its UberPop ride-pooling service.

Uber is nothing if not heavily scrutinized. Yet despite the heavy focus on its operations, Uber's corporate structure has not until now received a great deal of attention. It is still privately held, after all. But a careful examination of available records reveals a surprisingly complicated web of business entities for such a young company. Uber Technologies Inc., as the company is officially called, is a Delaware corporation with more than 60 subsidiaries in the U.S. and another 75 or more around the world. (Like the parent company, some of these offshoots in the U.S. have German names, including Neben, which means "next" in German; Gegen, which means "against"; and Schaben, which can mean either "scrape" or "cockroaches.")

DAVID PAUL MORRIS—BLOOMBERG VIA GETTY IMAGES

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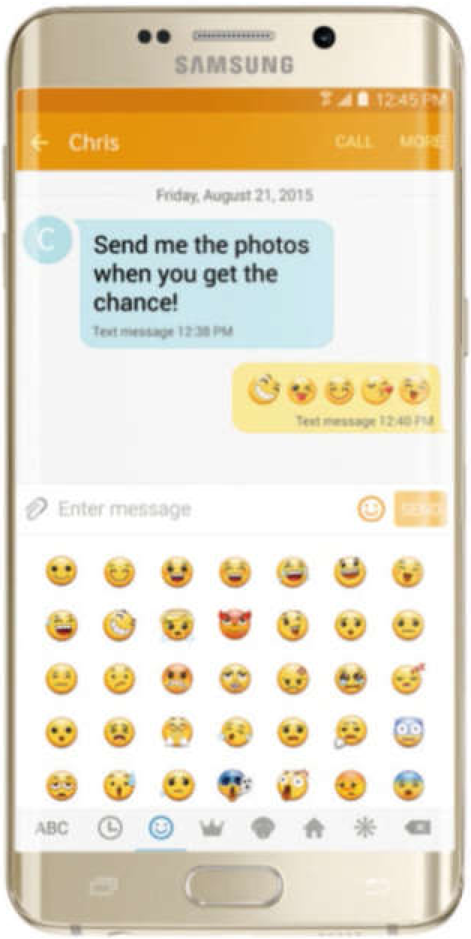

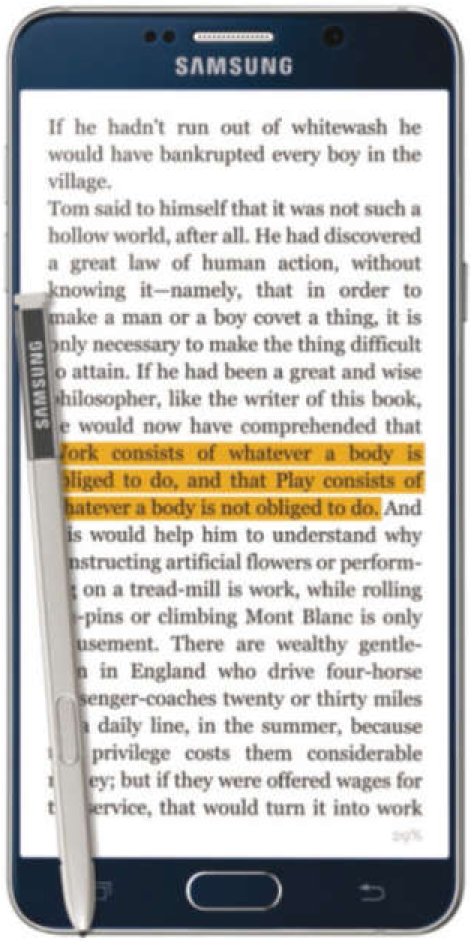

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Choosing between the beautiful Galaxy S6 edge+ with over 3.6 million pixels on the largest-ever dual edge display and the powerful Galaxy Note5 with Multi Window and the most advanced S Pen yet is a textbook case of a no-brainer. You're right either way.

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Outside the U.S., the company's network of subsidiaries has been carefully pieced together to create a state-of-the-art structure for minimizing taxes. The strategies that it employs are legal and similar to those of bigger tech names such as Apple, Google, and Facebook, not to mention multinational companies such as Starbucks and GE. "Silicon Valley is a small place," says Ed Kleinbard, a professor of law and business at the University of Southern California who previously served as the chief of staff of the U.S. Congress's Joint Committee on Taxation. "Just as there is a vibrant atmosphere for tech innovation, there is a vibrant climate for sharing tax innovation."

Tax strategies such as the ones that Uber and Google and Facebook use are enhanced by the very nature of their businesses—the fact that so much of the value of companies like Uber is in their intellectual property. That's particularly true given that the basic structure of our tax system was established in the 1920s. It's a lot easier to move your company's IP and the profits it generates to a tax-friendly offshore destination than it is to relocate your manufacturing base. "There are lots of types of companies that are good at tax planning," says Michael Graetz, a professor at Columbia Law School and a leading expert on international tax law. "The tech companies have the luxury of not having a lot of plants and equipment. They're more mobile."

Uber's business is taking off at a moment when global tax authorities are looking hard at the games corporations play with taxes. The Paris-based Organization for Economic Cooperation and Development (OECD) estimates that up to $240 billion in income eludes government coffers each year because of elaborate strategies that shift income among subsidiaries. Acting at the behest of the G-20 nations, the OECD in October delivered a slew of recommendations on how to eliminate some of the loopholes. In announcing the measures, the OECD's tax director, Pascal Saint-Amans, issued a warning to companies that "playtime is over." But tax experts say that the process of a global tax overhaul is just beginning.

Uber declined to make any of its executives available to discuss its corporate structure or its approach to tax planning. The company also declined to respond on the record to questions about the details of its tax minimization efforts. But in a statement, an Uber spokesperson wrote: "Our corporate tax structure is probably the least innovative thing about Uber. It's the standard approach adopted by most multinational companies. Uber is a significant net contributor to hundreds of local economies—creating new economic opportunities for thousands of people in each city where we operate. In terms of corporation tax, this is a moot point today because unlike more mature, highly profitable U.S. companies, Uber is still investing heavily to roll out our service around the world."

Kalanick's company clearly has plans to generate vast income from that investment. "If they didn't expect to be highly profitable, why would they need to do all of this?" observes Reuven Avi-Yonah, director of the International Tax LLM program at the University of Michigan Law School. And Uber appears poised to keep those future profits from being taxed at the U.S. corporate rate of 35%, one of the highest in the world. To better understand how Uber has set itself up to accomplish that, *Fortune* dug into financial statements of Uber entities and court documents in more than 100 jurisdictions globally. Here's how the strategy works.

IT SOUNDS LIKE an order you might place at a pub: "Double Irish with a Dutch sandwich." In the tax

TAKING MONEY OFF THE TABLE

358
Number of companies in the *Fortune* 500 (about 72%) that operate subsidiaries in tax-haven jurisdictions as of the end of 2014

$2.1 TRILLION
Collective amount held offshore by the 286 *Fortune* 500 companies that report offshore profits, with 30 companies accounting for $1.4 trillion of that total

$100 BILLION TO $240 BILLION
Amount the OECD estimates that governments worldwide lose annually in corporate income tax revenues because of tax-avoidance strategies

SOURCES: CITIZENS FOR TAX JUSTICE; U.S. PIRG EDUCATION FUND; ORGANIZATION FOR ECONOMIC COOPERATION AND DEVELOPMENT


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The organization **Charity: Water** brings clean and safe drinking water to people in need. Their teams use Slack, an easy-to-use messaging app that integrates with your existing tools and gathers all your communication in one place. It's teamwork made simpler, more pleasant, and more productive.
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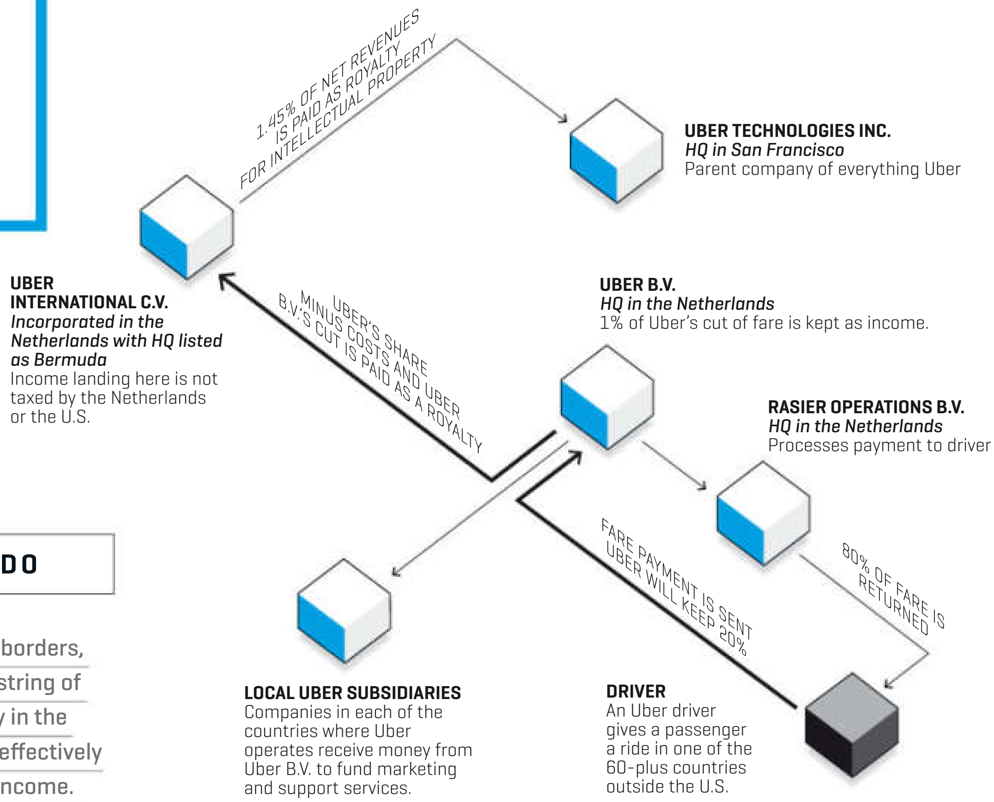
REVENUE DO-SI-DO

Beyond America's borders, Uber has set up a string of subsidiaries, many in the Netherlands, that effectively minimize taxable income.



world, however, it's a proven method—using a pair of Irish subsidiaries and another in the Netherlands—for moving income to a haven like Bermuda. Google has employed the setup to save billions on its tax bill over the years. Uber's approach is quite similar, but it removes Ireland from the equation and pulls off the same trick solely using subsidiaries created in the Netherlands. It's a structure sometimes known as a C.V.–B.V. or a double dip. Let's call it the "Double Dutch."

The strategy begins with Uber International C.V., the subsidiary that Uber created in May 2013. Uber International C.V. has no employees and, though it is chartered in the Netherlands, lists the address of a law firm in Bermuda as its headquarters. It sits atop Uber's network of subsidiaries outside the U.S. The C.V. at the end of the name stands for *commanditaire vennootschap*, which is essentially a Dutch version of a partnership.

Shortly after Uber International C.V. was formed, Uber made a couple of key agreements with its new subsidiary. On May 31, 2013, Uber International C.V. agreed to pay Uber Technologies a one-time fee of $1,010,735 plus a royalty of 1.45% of future net revenue for the right to use Uber's intellectual property outside the U.S. The two companies also agreed to share the costs and benefits of IP developed in the future. This cost-sharing agreement effectively allows Uber to keep most of its non-U.S. profits beyond the reach of American tax authorities. The timing of the agreements was beneficial. By arranging the transaction when Uber's private valuation was $330 million rather than the $3.5 billion it would jump to weeks later, the company was able to shift more future value out of the U.S. at a lower price.

The second key Uber subsidiary in the Netherlands—the one that makes its tax strategy a Double Dutch—is a company called Uber B.V. The car-hailing giant actually has a total of 10 subsidiaries in the Netherlands, all of which share a mailing address in a nine-story concrete and glass office building in the Grachtengordel, Amsterdam's historic central canal district. Seven of these companies, including Uber International C.V., have zero employees. But Uber B.V., itself a subsidiary of another Uber offshoot, had 48 employees at last count. It has a lot of transactions to process.

Whenever a passenger takes an Uber ride any-

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A WORLD ABOVE

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where in the world outside the U.S., whether it's in Beirut or Bangalore, the payment is sent to Uber B.V. The company typically sends 80% of that ride payment back to the driver via yet another Dutch subsidiary and keeps the remaining 20% as revenue.

Here's where things get interesting. Uber International C.V. and Uber B.V. have an "intangible property license agreement" in which Uber B.V. must pay a royalty fee to Uber International C.V. for the use of Uber's intellectual property—basically, the app that matches driver with rider. Under the terms of the agreement, Uber B.V. is to be left with an operating margin of 1%—effectively 1% of revenue—after subtracting the costs of operation. The rest of the profits get sent to Uber International C.V. as a royalty. And under Dutch law, that royalty payment isn't taxable.

Let's say that a passenger hails an Uber and takes a $100 ride across Rome (we'll assume "surge pricing" is in effect). The payment goes to Uber B.V., which sends $80 back to the driver. The driver is responsible for paying his own taxes on that income. Of the $20 that's left over, let's say that Uber subtracts half to cover costs, leaving $10. But that's not its taxable income. Uber B.V. will ultimately book only 1% of that initial $20 in revenue, or 20¢, as income. (The top corporate tax rate in the Netherlands is 25%, so the government will get 5¢ and the company keeps 15¢.) Uber B.V. then sends the balance of $9.80 to Uber International C.V. for the royalty. That's one scenario. If Uber B.V. subtracts only $5 for costs, then the royalty payment to C.V. would be $14.80. The point is this: No matter what the amount of the royalty income that Uber International C.V. receives, virtually none of it will be taxed. It is what's known as "ocean income," because it sits in a gray area between national tax authorities.

The setup creates a labyrinth of technicalities. When the Dutch look at Uber International C.V., they see a company that is controlled by U.S. owners and maintains a headquarters in Bermuda—so it must not technically have business operations, or taxable income, in the Netherlands. (Bermuda doesn't charge a corporate income tax.) To the U.S., however, Uber International C.V. identifies itself as a Dutch company, even if it's a subsidiary of a U.S. business. Therefore it is allowed to indefinitely defer taxes on its income to the IRS. (In theory, the U.S. has a global tax policy, meaning that it assesses income of U.S. companies no matter where those profits are generated. Uber has found a loophole.)

The only sliver of Uber International C.V.'s income that gets taxed is the royalty that the subsidiary pays to its U.S. parent—the 1.45% of net revenue it agreed to pay for the use of Uber's existing IP in 2013. For every $10 in net revenue that Uber International C.V. gets from Uber B.V., it must pay 14.5¢ back to Uber Technologies. That cut will be subject to U.S. taxes. The rest of the income can just pile up in Uber International C.V.'s coffers without being assessed.

In addition to its Dutch companies, Uber has separate subsidiaries in each country where it operates. But those companies don't reap direct revenues from the rides taken locally. Rather, they function as "support services" businesses. Uber Italy, for example, gets paid by Uber B.V. to market the brand in Milan and Rome. Much of Uber Italy's financing from Uber was made as a loan. The interest payments on that debt siphon off potential taxable income and are not taxed by Italy on the way out of the country because of a European Union directive. When it comes to tax management, no detail appears to be too small for Uber.

JUST WHEN UBER and other tech companies appear to have mastered the tax game, the rules could be changing. The OECD's recommendations for greater transparency will not unwind today's arcane strategies overnight. But the process is likely to lead to major reforms over time. And that could mean an even more aggressive tax environment for companies like Uber. "It represents the starting gun for a great tax grab by countries all over the world," says Kleinbard, the USC professor. "They're going to be very vigorous in coming up with theories about how companies like Uber or Google do business in their jurisdiction and owe taxes there."

Figuring out how to navigate this new frontier will be a test for every 21st-century corporation. Whatever the next big thing in tax innovation is, though, odds are that Uber will be the Uber of it.

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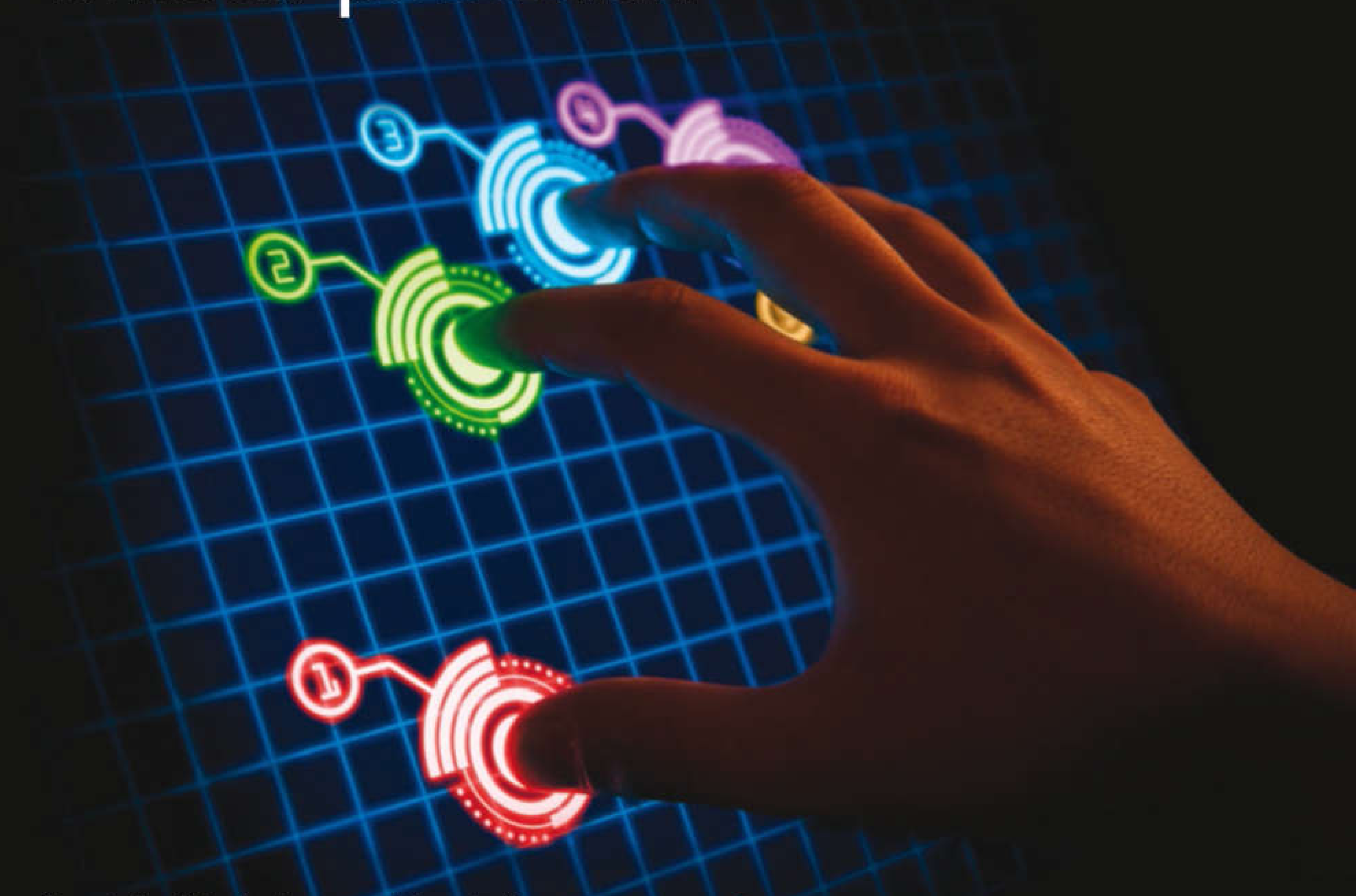

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THE BIG BUSINESS OF SUPPLY CHAIN DIVERSITY

IN A WORLD WHERE COMPANIES VIE FOR EVERY STRATEGIC ADVANTAGE, SUPPLIERS CAN BE KEY ASSETS—ESPECIALLY IF THEY BRING VALUE TO THE TABLE EVEN BEFORE THE FIRST DELIVERY ARRIVES.

LEADING COMPANIES ARE discovering victories as they diversify their supplier bases. Sourcing from businesses owned by women, minorities, veterans, members of the LGBT community, and the disabled is helping brands demonstrate inclusive values and forge closer ties with new customer groups.

And that's just over the long term. Near-term benefits can be even more compelling. Consider, for example, a company with goods to ship that bumps up against America's severe truck driver shortage. Opening this field to female owner/operators of big rigs can relieve bottlenecks and deliver crucial manpower—er, womanpower—to get the job done.

"We have at least 90% turnover in many cases in the truck driver ranks," says Rick Blasgen, president and CEO of the Council of Supply Chain Management Professionals, an industry association. "If I get more people from a different population, then that just helps reduce that number."

From manufacturing to retail, building diversity into supply chains has become a boardroom priority. A 2014 Calvert Investments survey of S&P 100 firms found that 85% had programs in place to encourage and support supplier diversity, up from 80% in 2010.

"A majority of S&P 100 companies have established supplier diversity programs," the Calvert report said, "demonstrating their understanding that procurement from minority- and women-owned businesses can widen their presence among consumers, and expose new market opportunities."

It's become big business. Twenty-one U.S.-based companies including Dell, Verizon, and Wal-Mart now spend more than $1 billion a year on goods and services from diverse suppliers, according to the Billion Dollar Roundtable, a Chicago-based advocacy group and think tank for supplier diversity.

Driving the wave is the business case. Companies find it makes sense to buy today from those who could become their new custom-

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THE BIG BUSINESS OF SUPPLY CHAIN DIVERSITY

ers tomorrow. As America becomes more ethnically and racially diverse, firms with inclusive supply networks have relationships with groups who inform everything they do, from customer service to new product development.

"It's not about social responsibility," says Billion Dollar Roundtable president and CEO Sharon Patterson. "It's about an economic imperative for us. If we want to be economically balanced, we want to make sure that everybody gets a share of the pie."

Anyone who needs convincing that supplier diversity is good for business need look no further than the track record of Johnson Controls, a global multi-industrial company with $42 billion in sales.

Since 1993, Johnson Controls has proactively made sure its buyers work with a wide range of suppliers, including minority- and women-owned businesses. Today the company ranks as a global leader, with $1.7 billion in annual spending with diverse suppliers.

"We really see it as a business imperative," says Grady Crosby, vice president of public affairs and chief diversity officer at Johnson Controls.

The practice opens doors to new markets. Example: When two automakers were contracting for vehicle seats a few years ago, both sought a partner with strong supplier relationships in San Antonio's Hispanic community. Johnson Controls had a joint venture that fit the bill and won the contracts.

"Here's a market that we may have been shut out of, or not had access to, had we not had a robust minority supplier development program," Crosby says.

But Johnson Controls isn't resting on its laurels. The firm actively mentors potential suppliers and encourages current ones to buy from diverse sources, too. From Johnson Controls' perspective, it's just good business.

The world is watching, in an age of concern about wealth gaps and income inequality, to see how corporate America fares in this arena. Governments from Sacramento to Washington, D.C., track what percentage of private-sector contracting goes to minority- and women-owned businesses. Companies pursuing government contracts do well to come to the table with a proven track record of using diverse suppliers.

Minority-owned businesses say the impact of diverse sourcing is concrete, local, and far-reaching. Contracting generates more than $400 billion in revenue and sustains more than 2.2 million jobs at the 12,000 companies making up the National Minority Supplier Development Council. That translates into cash in the pockets of racial and ethnic minorities on payday, then an economic boost for their neighborhoods when they spend it close to home.

Still, many companies wonder how to take part. The lament is familiar: We'd like to source more widely, but minority-owned (or woman-owned, etc.) businesses don't make what we need. Or at least we haven't found many, if any, that do.

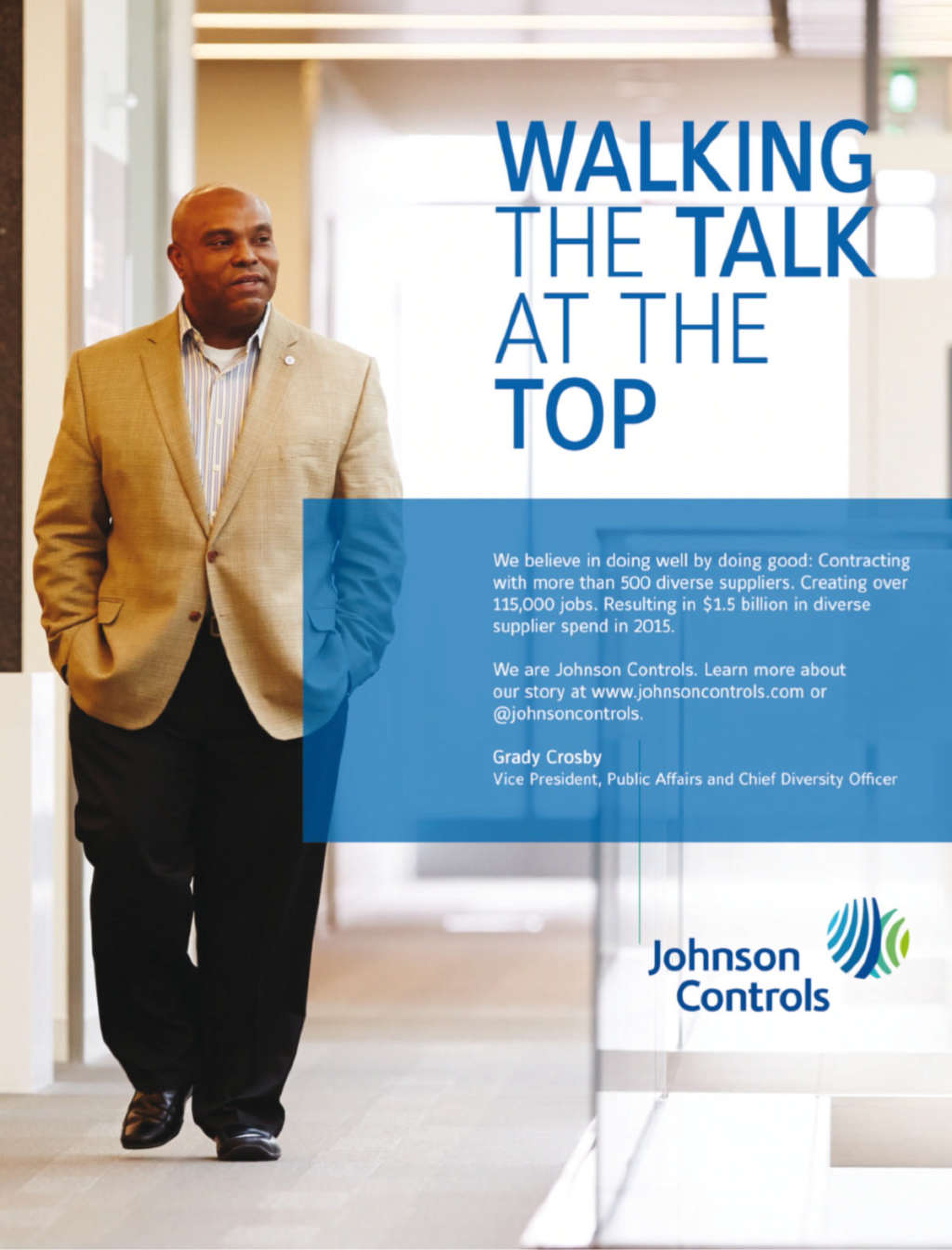
But proven practices are pointing the way to premier suppliers with diverse backgrounds. And when would-be suppliers have unrealized potential, they're getting the support they need to become world-class contributors: For example, some firms are leveraging incentives. They're tying a procurement officer's merit pay to results. If the company hits a supplier diversity target, he or she stands to get a bonus. If the supply chain becomes less diverse over time, his or her bonus pay gets cut.

They're also tapping into industry programs designed to pump up opportunities for traditionally disadvantaged groups. Example: This year, 12 colleges and universities unveiled a new CSCMP certification program that's geared especially for veterans, long-term unemployed, and underemployed. Known by its acronym LINCS (Leveraging, Integrating, Network, Coordinating Supplies), it's poised to advance veterans' supply chain careers, not just as employees but also as suppliers if they choose an entrepreneurial path.

Progress on the supplier diversity front is most likely to have staying power, observers say, when it's reinforced by an organizational culture that values cultural diversity from the mailroom to the C-suite. That means integrating the vision into day-to-day practices.

An inclusive supply chain might have seemed like an elusive ideal at one time, but no longer. Today it's an attainable goal that can help heighten efficiency, increase competition among suppliers, and drive down costs. No wonder companies are lining up behind it.

TOP: STEVE DEBENPORT/ GETTY IMAGES, BOTTOM: KALI NINE LLC/GETTY IMAGES


WALKING
THE TALK
AT THE
TOP
We believe in doing well by doing good: Contracting with more than 500 diverse suppliers. Creating over 115,000 jobs. Resulting in $1.5 billion in diverse supplier spend in 2015.
We are Johnson Controls. Learn more about our story at www.johnsoncontrols.com or @johnsoncontrols.
Grady Crosby
Vice President, Public Affairs and Chief Diversity Officer
Johnson Controls

THE BIG BUSINESS OF
SUPPLY CHAIN
DIVERSITY

The **Monsanto** Approach

WHEN A COMPANY LEADS IN THE GLOBAL AGRICULTURE MARKETPLACE, it strategically aligns with suppliers for innovative solutions in category areas including raw materials, packaging, marketing, and more. This effort spells opportunity for potential suppliers, but can be a tall order for promising diverse businesses that may not have fully developed formal programs for sales, finance, or even supply chain management.

But a group of these diverse firms is increasingly making the grade with help from a new initiative by Monsanto: The Monsanto Supplier Diversity Mentoring Program.

Launched in early 2015, the program educates companies on best practices and grooms them to become go-to suppliers. It's opening doors for the likes of Franklin Graphics, a minority-owned St. Louis company whose customers are already raving about how its proposals have improved under Monsanto's tutelage.

"As a Global Procurement organization, I feel we have a great opportunity to leverage our internal resources to expand and improve our diverse supply base," says Peter Stoynoff, chief procurement officer for Monsanto. "We also expect to learn a great deal from our supply partners about how we can improve how we work together."

The new mentoring program marks the latest push for ever more inclusiveness from a company that DiversityInc already recognizes as one of the top 50 most diverse in corporate America. Monsanto has 9% more African Americans, Latinos, and Asians in senior management than the U.S. national average, according to *DiversityInc*.

"Ensuring our employees can bring their whole self to work every day fosters creativity and provides solutions to some of the world's biggest challenges," says Melissa Harper, Monsanto's vice president for global talent acquisition and diversity & inclusion.

Monsanto's supply chain increasingly reflects the firm's inclusive culture. The rationale is simple: Monsanto serves a vast array of farmers worldwide, and a diverse supply chain helps the company stay connected to the needs, values, and ideas of its customers.

Perhaps no industry touches lives as intimately or spans cultures as extensively as agriculture. As a sustainable agriculture company, Monsanto serves growers from the United States, where high-tech farming is routine, to East Asia and sub-Saharan Africa, where traditional methods are more common and nearly half of all farmers are women.

"Monsanto's vision for sustainable agriculture strives to meet the needs of a growing population, and to help improve lives everywhere," said Daphanie Pointer, Monsanto's supplier diversity manager. Opportunities are proliferating. Additionally, Monsanto is working with a great number of women-owned businesses on key strategic projects, including one focused on expanding technologies. "Supplier diversity at Monsanto is aligned with our vision by improving lives in communities where our business partners live, work, and serve," Pointer said.

And the effort doesn't stop at U.S. borders. Working with diverse suppliers abroad is ever more important—and doable—for Monsanto. The company is working proactively with industry councils such as WEConnect International, a Washington, D.C.-based nonprofit that certifies women's business enterprises outside the United States for participation in supplier diversity programs.

"Our innovation is powered by the diverse, inclusive culture we've created," Harper says. "The best ideas come from teams with diverse backgrounds, experiences, and perspectives."

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Supplier Diversity
at Monsanto

Monsanto values an environment that is rich in inclusion and diversity.

As we work to develop a broad range of sustainable agriculture solutions for farmers, our focus is to provide access to business opportunities with diversity suppliers. Our commitment is to build a sustainable supply chain strategy by actively exploring and developing relationships with all suppliers.

To learn more about these opportunities contact Supplier Diversity

Email us: supplier.diversity@monsanto.com
Register on our website: www.monsanto.com/procurement
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After surviving a star-crossed buyout, the financial giant has rebounded and gone public in the year's largest IPO. Now CEO Frank Bisignano is staking First Data's comeback on a big tech bet—enticing millions of small businesses to buy big-data analytical services and apps through its new credit card terminals.

by Shawn Tully

It was the sale Scott Nuttall had to make. On a Saturday morning in April 2013, Nuttall was sitting at a corner table in the nearly empty restaurant at the Hilton in Short Hills, N.J., striving to persuade his burly guest to trade one of the best jobs in banking for a chance to rescue one of the hardest of hard cases.

For Nuttall, the recruiting mission was personal, even emotional. Six years earlier he'd led the nearly $30 billion leveraged buyout of First Data, a payments-processing colossus, for KKR, the legendary firm where Nuttall serves as chief of asset management. Since then, First Data had met failure at almost every turn, churning through CEOs along the way.

Customers using a Clover Mini credit card terminal—one of First Data's new "countertop computers" for small business—at the Tin Pot Creamery in Palo Alto

PHOTOGRAPH BY **ROBYN TWOMEY**

74 billion | TRANSACTIONS GENERATED EACH YEAR BY **FIRST DATA'S** MERCHANT CUSTOMERS. THAT'S 2,300 A SECOND—INCLUDING NEARLY HALF THE CARD SWIPES MADE BY U.S. SHOPPERS

Nuttall was so determined to hire the star manager sitting at his elbow that he'd canceled a vacation to Italy for his wife's 40th birthday to arrange this meeting. "She said that we'll have a lot less stress if you find the right CEO ... so go ahead and cancel," recalls Nuttall. "I knew this hire could be the difference between the greatest success or failure I've been part of at KKR."

The prize candidate was Frank Bisignano, co-COO of J.P. Morgan Chase and a bulwark of the Jamie Dimon–led team that revitalized that bank. As they breakfasted on omelets, Nuttall stressed that First Data might perform better if it got smaller and more focused. KKR planned to sell big pieces of the $11 billion company. "First Data may just be too big and complex for any one person to run," Nuttall said.

Bisignano's response amazed his host. "Don't sell anything!" he told Nuttall. Bisignano said that First Data's immensity could prove its biggest asset. "Whatever you're thinking of selling, I can fix it," he said. "It will take an A-team, and I'll field one." And he argued that First Data—best known, when it was known at all, for the unglamorous work of routing your charges when you swipe a credit card at the gas station or corner deli—could reinvent itself as a tech juggernaut. The key to the transition, Bisignano said, was in his pocket. He held up his iPhone and declared, "First Data can be to merchants what this device is to millions."

By the time luncheon BLTs arrived, Nuttall had landed his CEO. And the leader Nuttall describes as a "force of nature" had sold *him* on a cultural upheaval that could turn the industry's lumbering warhorse into a breakout innovator—one that would compete with Silicon Valley unicorns to bring big data to small businesses.

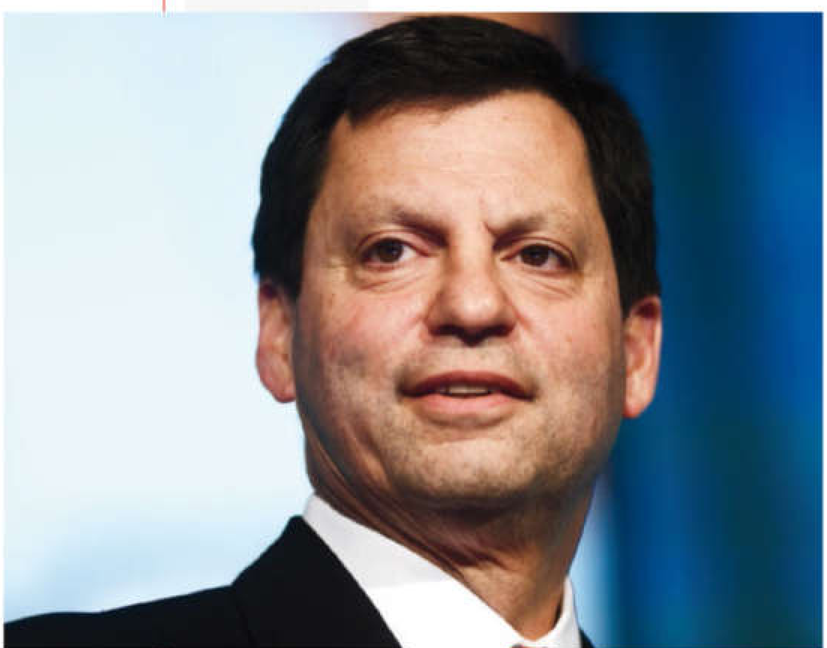
But before Bisignano could pursue that plan, he had to address a textbook case of a leveraged buyout gone wrong. KKR's LBO had turned First Data into one of the most heavily leveraged companies in America, saddling it with hefty interest payments just as revenue growth leveled off because of the effects of the Great Recession. Smaller, nimbler competitors were poaching customers by offering lower fees and, often, better technology. The company was en route to posting its sixth consecutive annual loss; by the time Nuttall met Bisignano, KKR valued its stake in First Data at just 60¢ on the dollar.

What's more, Bisignano inherited a workforce that had never before experienced a drop in sales—and sometimes seemed either too paralyzed or too lackadaisical to confront it. Not long after becoming CEO, Bisignano recalls, he visited First Data's biggest operations facility—an outpost in Omaha, full of ardent University of Nebraska football fans. Straining to light a fire under the staff, he told them, "If the University of Nebraska had a 2–10 season, how would you feel? That's how First Data has been doing!"

These days, First Data is no longer a laggard. The 56-year-old Bisignano is carrying out the strategy he sketched at the Hilton, and reviving KKR's biggest holding. First Data has curbed expenses, reduced debt costs, and improved cash flow. Investors just gave the company a partial vote of confidence: First Data's IPO, on Oct. 15, was the largest of 2015, raising $2.6 billion and giving the company a market cap of $14 billion. In the wake of the offering, Bisignano, Nuttall, and others on First Data's team gave *Fortune* an exclusive account of the company's turnaround.

It's a welcome reversal of fortune for KKR. When it took First Data private in 2007, it paid the equivalent of $15.81 a share; after the IPO, shares traded around $16. That's hardly a return to boast about (the S&P 500 is up 31% since the buyout), but for KKR, which, along with its investors, still owns 60% of the company, the investment has swung from a loss of $2.5 billion to a modest gain. "Frank is proving we were right about First Data's potential after all," says Nuttall.

But Bisignano's view of that potential is wider than anything KKR originally envisioned. He wants First Data to offer



Bisignano built a reputation as a Mr. Fix-It, leading unglamorous but profitable overhauls at Citigroup and J.P. Morgan Chase.

NOAH BERGER—REUTERS

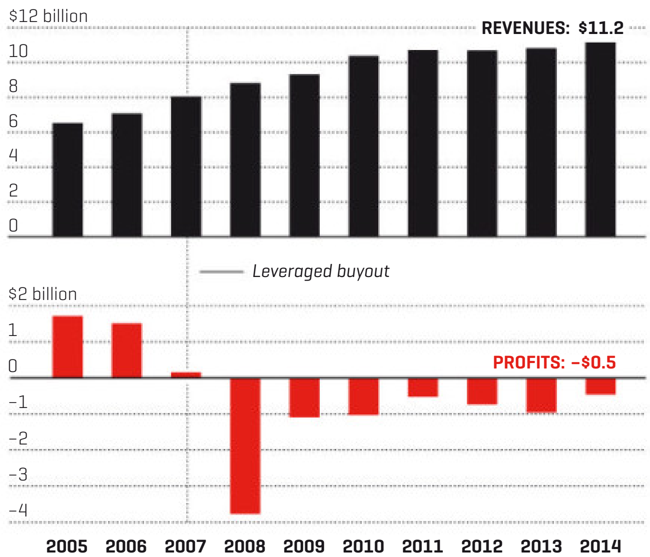
ice cream parlors, hairdressers, and every manner of small merchant the high-tech analytical tools that until now have benefited only the likes of Walmart and McDonald's. "For years, we've been selling small businesses these dumb 'bricks' that do nothing but swipe cards," he says, in a gravelly voice—the legacy of a bout with throat cancer. "We're replacing those bricks with bar and countertop computers that will manage inventory and tell you which waiters at which tables sell the most expensive bottles of wine." His big idea: Arm new terminals—specifically, First Data's Clover devices—with business-boosting apps, and customers will reward the company with Apple-like loyalty and the soaring revenue that comes with it.

It's an ambitious vision—and still a long way from being realized. Right now "there's not enough proof merchants have sufficient demand for these types of solutions," says Gil Luria, an analyst with Wedbush Securities. "We're a few years from knowing if it will drive real growth for First Data." Even if the demand is there, the payment-services field is full of competitors, from established players like Chase Paymentech and PayPal to startups such as Square, ShopKeep, and Revel Systems, all ready to fight First Data for market share.

Bisignano says First Data's huge customer base—the company manages payments for 6 million merchant locations worldwide—will help him capture enough new business to make a major difference, especially at a time when new regulations are pressuring many businesses to upgrade their equipment. If he's wrong, First Data may still generate enough revenue from traditional businesses to become modestly profitable again. But if he's right, it could harness the Clover and its heirs to become one of the top moneymakers in financial services.

DRAGGED DOWN BY DEBT

KKR'S 2007 LBO SADDLED FIRST DATA WITH DEBT JUST AS ITS REVENUE GROWTH BEGAN TO SLOW; PROFITS QUICKLY DISAPPEARED.



GRAPHIC SOURCE: SEC FILINGS

You may never have heard of First Data,

but chances are it has handled hundreds or even thousands of your credit card transactions. It's a central pillar in payment services, one of the fastest-growing and least understood industries on the planet. "More and more businesses that used to take only cash, from taxis to dry cleaners, are switching to cards," notes Tien-tsin Huang, an analyst for J.P. Morgan, and consumer habits are changing accordingly. From 2009 to 2014, credit card, debit card, and electronic payments surged more than 40% in the U.S., to around $6.5 trillion. By 2018 some 81¢ of every dollar spent will be card based or electronic, vs. 65¢ today.

In this $900 billion global business, the best-known players are Visa and MasterCard, but First Data is a quiet giant: Its 2014 revenues of $11.2 billion exceeded those of MasterCard ($9.5 billion) and approached those of Visa ($12.7 billion). It's the only stalwart operating in all three major fields of payment services, and it dominates two of them.

In "merchant acquiring"—selling credit card terminals to merchants and servicing their accounts—First Data is the biggest competitor. Its 6-million-customer base generates 74 billion transactions a year, or 2,300 a second. First Data is also huge in transaction processing, for both merchants and banks: It checks accounts for fraud, ensures that there's sufficient cash to cover transactions, approves or declines them, and sends statements on behalf of banks. First Data handles processing for 42% of all card transactions in the U.S., involving hundreds of millions of cards; its blizzard of statements makes it one of the U.S. Postal Service's biggest customers. All told, First Data processes a staggering $1.7 trillion in payments a year in the U.S., the equivalent of 10% of GDP. (It also has a broad footprint outside the U.S., generating around 25% of revenue overseas.) In a third business—coordinating transactions data among merchants, processors, and banks—First Data's STAR debit network is a smaller presence; nonetheless, First Data often receives revenue from three sides of a transaction: from the merchant, from the bank, and through STAR.

In short, First Data runs the kind of invisible-but-essential business on which Bisignano built his reputation. A Brooklyn-born grandson of Italian immigrants, he's spent most of his career building or fixing back-office operations at major banks. His 29th-floor, glass-walled office overlooking the 9/11 Memorial Plaza shows how far such work has taken him. On the walls hang

photos of Bisignano grinning with a gallery of the powerful and famous, from Timothy Cardinal Dolan of New York to Arizona Cardinals star Larry Fitzgerald. Above all, he prizes a portrait of the J.P. Morgan Chase management team from 2008, featuring him with former boss Jamie Dimon and two other alumni who now lead huge financial companies—Bill Winters, chief executive at Standard Chartered, and Charlie Scharf, CEO of Visa. Also in the photo: Jes Staley, the front-runner to become Barclay's new chief executive, and former Citigroup CFO Heidi Miller, now a First Data director.

In 1994, Dimon hired Bisignano to run operations at Smith Barney. As Dimon and Sandy Weill made acquisition after acquisition, culminating in the purchase of Citicorp in 1998, Bisignano's roles in everything from IT to purchasing steadily grew. By 2001, Citi had 16,000 staffers in downtown Manhattan, many working for Bisignano. On the morning of Sept. 11, after the first World Trade Center tower fell, Bisignano rushed to the street, megaphone in hand, and yelled, "Walk north!" He then led thousands of Citi workers to safety at an operations hub on West 34th Street, and later kept Citi's computers running amid the post-attack chaos.

Bisignano also proved that he could revive underperformers. In 2002 he took over Citigroup's Global Transaction Services, a money-losing backwater; he reinvented it as a center where multinationals could outsource accounting and foreign-exchange transactions, and by 2005 it was generating more than $1 billion in annual profit. In late 2005, Dimon lured Bisignano away from Citigroup to be chief administrative officer at J.P. Morgan Chase; there he turned around a mortgage business encompassing the foreclosure-laden portfolio of the former Washington Mutual. (Bisignano accomplished that after his fight with throat cancer, a condition that he speculates may have come from working in toxic soot after 9/11.)

In 2012, Dimon promoted Bisignano to co-COO. But Bisignano felt ready for a top job. "All my mentors, like Sandy Weill and Jim Robinson [ex-CEO of American Express] said it was time," says Bisignano. One Thursday in 2013, Nuttall says, he heard from old Citi friends of Bisignano's (including Joe Plumeri, who'd gone on to run an insurer for KKR), confiding that "a little birdie says Frank might be willing to make a move." Two days later, Bisignano and Nuttall were face-to-face at the Hilton.

THREE TIPS FOR A TURNAROUND

IF FIRST DATA BECOMES A FAST-GROWING COMPANY AGAIN, IT COULD BE LARGELY THANKS TO CHANGES LIKE THESE.

Create an 'Equity Culture'

New CEO Frank Bisignano substantially raised pay at the top, using large stock grants to recruit an A-team. He also granted shares to each of First Data's 23,000 employees, "so they could see the connection between their hard work and the outcome," he says.

Give More People More Responsibility

Under previous management, a handful of executives made all the big decisions. Bisignano expanded the management committee from five to 17, giving the heads of technology, operations, and compliance important seats at the table.

First, Fix the Business You've Got

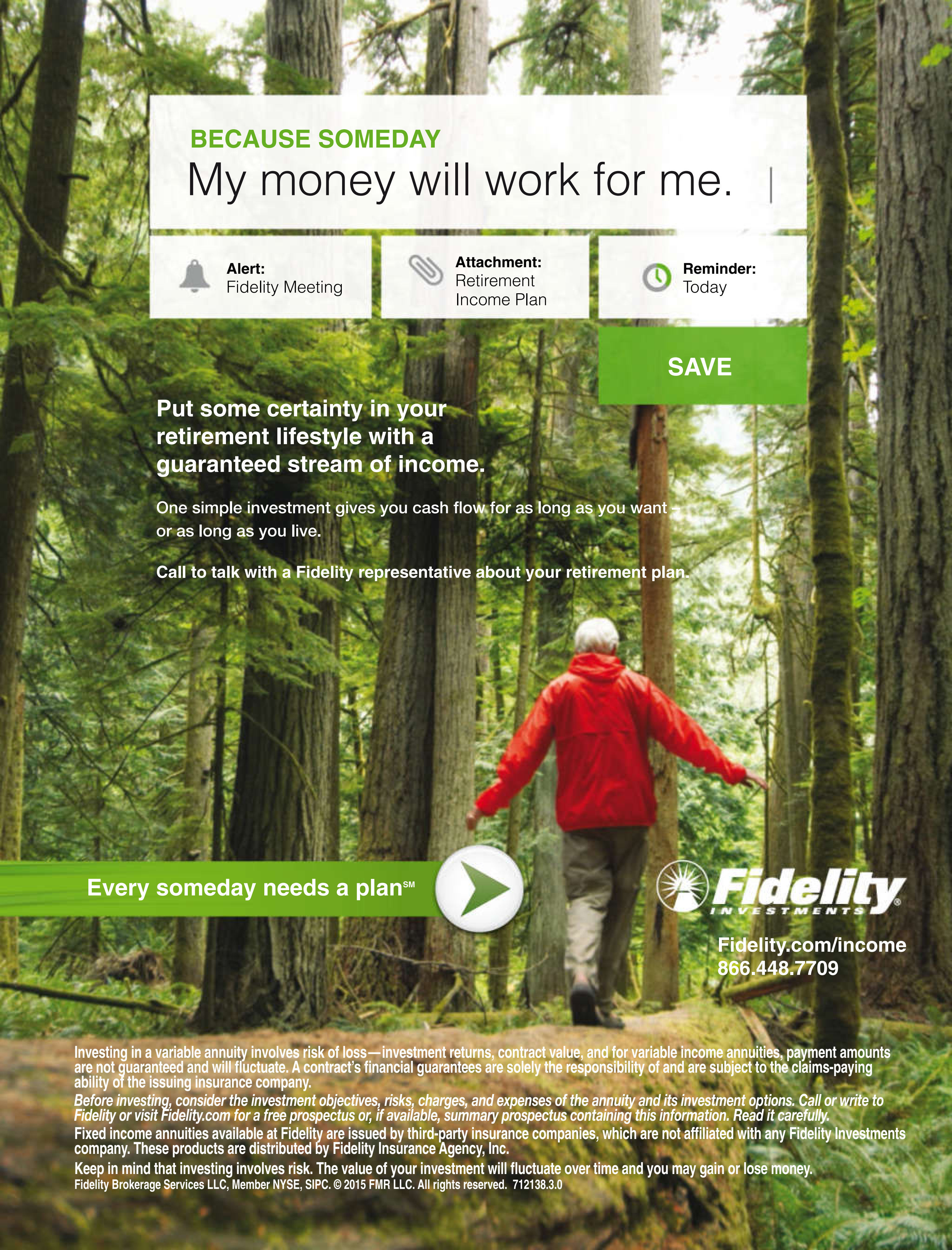
Bisignano spent heavily to modernize First Data's aging tech infrastructure to ensure that its core transaction-processing business stayed competitive and cost effective. Once the foundation was fixed, Bisignano focused on fresh products to spur growth.

There were plenty of problems on the menu. KKR's buyout had burdened First Data with $22.6 billion in debt, at extremely high interest rates. "The thesis was that First Data would innovate and keep growing," says Nuttall, "so as cash flow would keep rising, we'd pay down the debt," reaping outsize returns as equity expanded. But the deal closed in September 2007—just before the Great Recession, when credit and debit card transactions dropped sharply. Beginning in 2010, First Data's revenue stopped growing for the first time ever; cash flow plummeted too. And First Data's processing services were becoming commoditized: Each year, Nuttall says, the company lost about 15% of its merchant customers to competitors that offered lower fees and better service.

First Data's troubles had already thwarted two accomplished CEOs—former Compaq and WorldCom chief Michael Capellas (2007–10) and ex-Paychex CEO Jon Judge (2010–13). By the time Bisignano arrived, KKR had put two of First Data's major businesses up for sale, the STAR debit card network (now a leader in PIN-less debit transactions) and its private-label credit card franchise. Bisignano called off both sales: For him, retreat wasn't an option. He reasoned that if First Data could escape the commodity syndrome by following his iPhone vision, it could become highly profitable.

First the company needed a fresh culture. Prior to Bisignano's arrival, a small group of executives had handed down orders to its 23,000 employees, and neither technology nor operations had a seat on the management committee. "Five guys were running the company," he recalls. Visiting headquarters in Atlanta, he saw "these palatial offices far away from everyone else, including a suite for the CEO with a sitting room and bathroom."

Bisignano ripped out the offices, replacing them with 200 workstations. He also expanded the management team, giving more people broader responsibilities. Just as his mentor Dimon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had drawn loyalists from Citigroup to J.P. Morgan, Bisignano recruited lieutenants from among his former J.P. Morgan and Citi collaborators, including his president, Guy Chiarello; compliance chief Cindy Armine-Klein; operations head Christine Larsen; and CFO Himanshu Patel. (Plumeri became vice chairman.) Bisignano also moved First Data's executive offices to New York City, although headquarters remain in Atlanta.

Bisignano rings the ceremonial bell at the New York Stock Exchange for First Data's IPO on Oct. 15 alongside two of his longtime collaborators, First Data president Guy Chiarello (left) and vice chairman Joe Plumeri.

To attract talent, First Data enormously increased compensation at the top: Annual pay packages in the $7 million to $10 million range, mostly in stock, are now the norm for the management committee. The boss himself is reaping royal rewards. In 2013 and 2014, Bisignano received stock and option grants valued at $77 million; after the IPO, by *Fortune*'s estimates, his holdings are worth well over $100 million. Bisignano also insisted on making every rank-and-file employee a shareholder. "I told KKR, 'I'm going to ask a lot of people to do a lot of hard things,'" he says. "They should see the connection between their hard work and the outcome." As his mentor Weill tells *Fortune*, one strength of Bisignano's is that "he can relate down as well as relating up. CEOs who can't relate down get in a lot of trouble." All told, First Data has issued about 2.2% of its shares, worth some $300 million, to its employees.

Bisignano's team has frozen operating expenses—in part by flexing its tech muscles. First Data had been assembled from multiple acquisitions and hadn't integrated its crazy quilt of some three dozen separate platforms. Systems for gas stations, restaurants, and clothing stores, for example, operated on totally different software. In its first eight months, the new team spent $180 million to replace outdated servers and storage and began shrinking the number of platforms. "We threw out 60 tons of old equipment," says Chiarello—an amount greater than the weight of a Boeing 737, he points out.

Bisignano and KKR are also attacking First Data's interest burden. A $3.5 billion private placement in 2014 went mainly to lowering debt. Over the past 16 months, they've refinanced about $8 billion in borrowings—including $2.1 billion in fixed-rate loans, on which they trimmed the average interest rate from 7.75% to 4.9%. The result: a $300 million reduction in annual interest payments, to $1.6 billion. As Wedbush's Luria points out, the debt remains a major drag: About half of First Data's remaining debt is pegged to variable rates, so the company will face higher expenses if rates climb. Indeed, First Data's IPO priced lower than many commentators expected, reflecting investors' concerns over the debt load. Still, proceeds from the offering could lower First Data's debt to $18.5 billion, taking the company closer to sustained profitability.

Even as it brought costs in check, Bisignano's team searched for products that could lure more merchant customers by improving on the old bricks—and the team viewed small businesses as the biggest opportunity. Large retail chains, from McDonald's to Macy's, benefit from sophisticated point-of-sale systems equipped with special software for managing inventory, employee schedules, and other functions. But although small businesses account for 70% of U.S. transaction-management revenue, data-analysis innovations and management tools for those merchants lagged far behind. "They were stuck with the same old technology for at least 15 years," says Chiarello.

Bisignano aims to replace those bricks with app-rich new devices. And while persuading customers to change might otherwise be onerous, First Data has timing on its side. On Oct. 1, a new rule took effect that will press merchants to buy new "dip" terminals designed to read EMV cards, which are equipped with a microchip to prevent fraud. Until now, card issuers have been liable when thieves use information from a credit or debit card's magnetic strip to make fraudulent charges. EMV cards have a strip *and* a chip; going forward, if a merchant doesn't have a terminal that can read the chip and thieves use an EMV card's strip data, the merchant, not the issuer, will be liable.

As "reterminalization" kicks in, First Data hopes to scoop up customers with the EMV-friendly Clover. ("It's our daily

RICHARD DREW—AP PHOTO

Know Your Net Worth
How Do You Stack Up?

Why Knowing Your Net Worth Is Essential

If you are close to retirement or already retired, knowing how much you are worth is essential. It will help you realistically determine the kind of retirement you can actually afford as well as help you select the best financial strategies to grow, protect and distribute your wealth.

How Do You Stack Up?

You'll find out where you rank in terms of total net worth and liquid net worth compared to others. Plus, if you have liquid net worth of over $500,000, you'll learn of some investment options that are now open for you as well as which ones are probably not right for someone of your financial standing and achievement.

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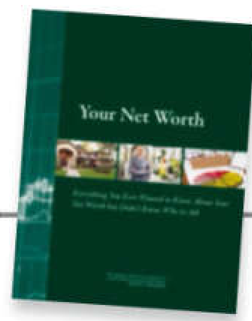

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bread," says Bisignano.) Clover is the product of a Silicon Valley startup First Data bought before Bisignano arrived, but his team recognized its potential as a platform for merchant-ready apps. Clover comes in four versions: The Station, a large screen mounted above a cash drawer, debuted in 2013, and over the past year First Data has added the handheld Mobile; the Mini, which can fit on a countertop; and the Go, a card reader that plugs into a cellphone.

As First Data encourages developers to build apps for Clover, its size has proved to be a strength. Smartphone app makers, Bisignano notes, "want to go with an Android or iPhone, the platforms with the biggest markets"; First Data's omnipresence gives Clover similar clout. The company says Clover has attracted more original features than any other small-business terminal: 106 so far, with 277 more in the works. The Salon Scheduler app reminds spa and manicurist clients of appointments and prompts them to rebook if they've been absent. Give an app called Stock the data on how much sauce and cheese go into a large pizza, and it will reorder ingredients automatically, based on your sales.

The most popular app is an employee-management tool called Homebase. It's been a boon to Angelo Vivolo, proprietor of Vivolo, an Italian eatery on Manhattan's Upper East Side. "I can check how much revenue each waiter generates every night," he says. "If a waiter is getting low tips, there's a good chance they're providing bad service." Servers check in for work by typing in a PIN, and a tiny camera takes their picture to ensure no one is faking. The Clover, says Vivolo, gives him tools that big businesses already have. "It's like going from the Stone Age to the modern era," he says.

First Data's hope is that apps like these will persuade customers to shun rival processors, even if they're cheaper. The apps could also greatly enhance the revenue First Data collects from each customer. Take the example of a pizzeria generating $200,000 in annual sales. Currently, First Data's share of its account-management, processing, and transaction fees would total about $2,000 a year. If the pizza maker upgraded to the Clover and used its various apps and services, First Data could reap another $60 to $100 a month in fees—a bump of as much as 60% over the old "brick." And that's mainly profit: With its huge computing infrastructure already in place, the extra services generate little additional cost for First Data.

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First Data is also exploiting big data. For years the company didn't save the enormous quantities of information it collected. Bisignano put a stop to that "gigantic mistake." And in 2014, First Data teamed up with the Silicon Valley data-analysis specialist Palantir Technologies to develop a new First Data product called Insightics, which deploys the processor's vast store of information to provide consumer-research tools to small businesses like Tin Pot Creamery.

Becky Sunseri, a former pastry chef at Facebook, opened that gourmet ice cream purveyor in Palo Alto in 2013, offering such exotic flavors as salted butterscotch, and coffee with cocoa-nib toffee. She was considering a second location, in nearby Los Altos, but she feared that a new shop would cannibalize customers and sales from the original. Sunseri's Clover rep signed her up for a trial run with Insightics, which costs the typical retailer about $30 a month. Insightics produced a heat map showing where her current customers were coming from. The welcome revelation, says Sunseri: "Only about 1% of them came from Los Altos." Last November she launched a second location there, and both have thrived. Insightics also alerted Sunseri that Tin Pot's sales were lowest at midday, so she started offering lunchtime discounts that sweetened sales. From Clover, she says, Tin Pot got "data we would never have the time or the finances to collect or analyze ourselves."

More than 100,000 Clovers are now in service, even though three of its four models are still new to the market. Larry Berlin of tech research firm First Analysis calls Clover's sales "okay but not great," given all the competition in the field. But Berlin goes on to note of First Data, "They have far better distribution than anybody else, which gives them a leg up."

That's Bisignano's belief too. The CEO admits that most Clover sales have gone to new customers, not the merchants First Data currently serves. The company needs to convert hundreds of thousands, if not millions, of its legacy users to become the raging success Bisignano promises. First Data, originally prized by KKR for its boring predictability, may seem like the unlikeliest of contenders for such an accomplishment. But whatever happens with Clover, it's clear Bisignano has changed the culture of a company once tarred as "too big to succeed." ■

THE NEW GEEK SQUAD

(THAT'S FIXING BEST BUY)

Mary Lou Kelley E-Commerce President

Shari Ballard U.S. Retail President

Sharon McCollam Chief Financial Officer

BY
JEN WIECZNER

Once a badly wounded victim of the e-commerce revolution, the electronics chain is back in the black, thanks to a savvy overhaul by a largely female management team. Will doubling down on customer service—and betting on the Internet of things—enable Best Buy to grow again?

PHOTOGRAPHS BY
MELISSA GOLDEN

NO MATTER HOW much your family got on your nerves last Thanksgiving, Best Buy executives probably had a more stressful holiday than you did. ¶ By the time Turkey Day 2014 arrived, the company had spent two years pursuing a sweeping, difficult turnaround strategy, and with the kickoff of the holiday shopping season, when Best Buy typically earns a third of its annual revenue, the stakes were stratospherically high. ¶ To ramp up for Black Friday, the electronics retailer's stores opened at 5 p.m. on Thanksgiving, the earliest they had ever begun their door-buster deals. Forgoing cranberry sauce and stuffing, some 40 execs made a foray out from their

CEO Hubert Joly greeted customers at a store in Roseville, Minn., on Thanksgiving in 2014. Strong Black Friday sales last year were a sign of the retailer's recovery.

Richfield, Minn., headquarters to visit local stores (their own and the competition's)—and were greeted with the subzero temperatures of one of the Twin Cities' coldest Thanksgivings on record. Chats with chilly customers couldn't answer their burning question: Will this season be a boom or a bust? And around 4 a.m. Friday morning, CEO Hubert Joly was jolted out of bed by a frantic call from Mary Lou Kelley, his relatively new head of e-commerce, telling him that the company's website had gone down during an unexpected traffic surge.

By the time the executives reconvened Black Friday evening, few had slept or eaten more than a slice of pizza. But as data rolled in from across the country, the mood perceptibly lifted. Like campaign workers watching election results, the team was getting good news, state by state—stores had been full, sales numbers were on track. The crowd was too cautious to celebrate, recalling disappointments of Christmases past. "You have to remember that nothing is over until the fat lady sings," Joly says. But by the time Best Buy reported results for the holiday period, their hopes had been realized: Comparable-store sales rose for the first time in four years—up 2.5%, even as the consumer-electronics industry overall reported declines. And fourth-quarter profits jumped 77% year over year.

The performance was particularly validating for chief financial officer Sharon McCollam, a revered veteran of Williams-Sonoma whom the 56-year-old Joly calls his copilot. Joly, a former McKinsey partner who became CEO in the summer of 2012, had lured McCollam out of retirement that December. Since then she had implemented a rigorous budget; overhauled Best Buy's IT, supply chain, and logistics; and even inspected stores with a "white glove" dust test. By the time the holidays were over, she was confident that she had engineered an enduring revival. "This one thing will probably go down in my personal history book as one of the most meaningful things that I ever got to do," McCollam says.

This Black Friday, Best Buy will have something to build on. On the eve of its 50th anniversary, Best Buy—bogged down three years ago in mounting losses and management disarray—seems to be back on track. The largest consumer-electronics retailer in the world (No. 72 on the *Fortune* 500) and the only surviving U.S. nationwide chain, Best Buy has redesigned most of its 1,433 U.S. stores, put its retail employees through retraining boot camp, become a force in e-commerce, and excised $1 billion in annual costs. Earnings have beaten Wall Street's expectations for 11 quarters in a row; since December 2012 its stock has roughly tripled. "Best Buy is one of the most impressive turnarounds in retail over the last decade," says Scott Galloway, marketing professor at NYU Stern and founder of brand-research firm L2. "Three years ago the conventional wisdom was they were a carcass that had just been run over by Amazon."

Today Best Buy executives are optimistic enough that they agreed to talk about their transformation for the first time, with *Fortune*. Still, they're keenly aware that the turnaround is far from finished—and that bogey, Amazon, gets bigger every day. Best Buy is far smaller than it was in its heyday, having sold off underperforming divisions in China and Europe. It's expecting just under $40 billion in revenue for

TAPE ON PREVIOUS SPREAD: ISTOCK AND SHUTTERSTOCK; JOLY: JEFF WHEELER—THE STAR TRIBUNE

the current fiscal year, down from $51 billion four years earlier. Its market cap, at $12 billion, is less than half of what it was at its 2006 peak. Best Buy is the leader in a plateauing industry, a conundrum that could eventually box in the big-box retailer's growth. Growing revenue again is "not an easy task in a mature category," says Stephen Baker, vice president and consumer technology analyst at market researcher NPD. "What the consumers want and buy is changing, and if you're not flexible to move with that, you're going to end up with Circuit City and CompUSA"—that is, out of business.

To avoid that fate, Best Buy is betting on a contrarian theory: As the Internet of things is built into everything from thermostats to wristwatches, Best Buy's brick-and-mortar emporium—and its army of roving IT guys, the Geek Squad—will be in demand to help people catch up with the increasingly complicated gadgets. Already its sales of connected-home devices are accelerating, and its tech experts make some 4 million house calls a year to help customers rig up their systems—service that Best Buy's closest competitors, Walmart and Amazon, do not offer. As "the greatest toy store for adults the world has ever seen, Best Buy has a special responsibility and opportunity" in this realm, says Robert Stephens, the Geek Squad's founder, who last served as Best Buy's chief technology officer before leaving in 2012.

In a wrinkle that defies gadget-geek stereotypes, Best Buy's leadership team is largely female: Women run operations accounting for 90% of its revenue. Inspired by a McKinsey colleague's gender-diversity research—on which Sheryl Sandberg's *Lean In* is partly based—Joly has fully committed to it at Best Buy. A mirthful Frenchman known for his lilting delivery of quotations of everyone from Winston Churchill to Batman, Joly sums up his rationale: "If it had been Lehman Sisters instead of Lehman Brothers, maybe it would not have been the catastrophe that it was."

BEST BUY WASN'T quite Lehman when Joly arrived, but it was certainly in crisis. Unlike such rivals as CompUSA, Circuit City, and RadioShack (all of which went bankrupt), Best Buy had kept revenue growing through the Great Recession, opening more stores and scooping up customers as its peers collapsed. But by 2012, with locations in every state and Puerto Rico, Best Buy was running out of room to expand, and it was losing market share under the onslaught of discounts from websites like Amazon.com.

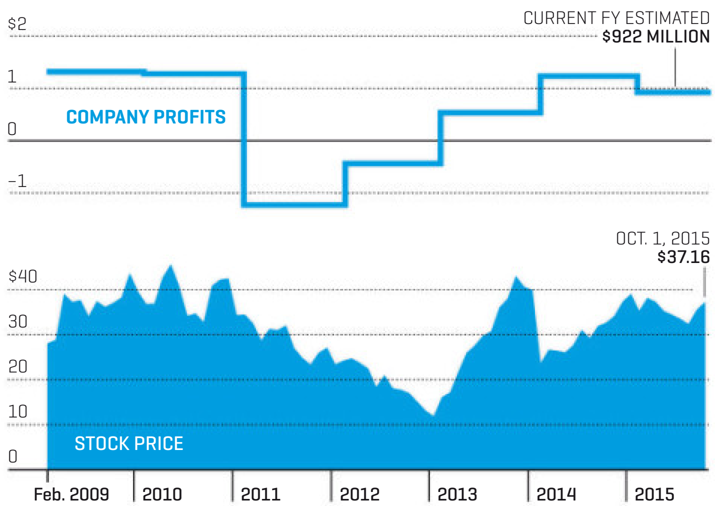
Just as sales and profits began deteriorating, a scandal roiled the company. In April 2012, CEO Brian Dunn quit amid allegations that he'd had what a board investigation deemed an "inappropriate relationship" with a female employee. The board also discovered that Best Buy's founder and chairman, Richard Schulze, had known about the affair for months; he resigned upon the release of the board's report. (Dunn never commented on the relationship claims; Schulze stated at the time that he accepted the committee's findings.) Best Buy appeared to have passed a point of no return; shares plunged to a 12-year low. "They were just a rudderless ship," says BB&T Capital Markets analyst Anthony Chukumba.

Things got worse when Schulze, who founded the company in 1966 as a St. Paul record store called Sound of Music, resurfaced after his resignation with an unsolicited bid to take Best Buy private. Schulze was hardly appeased in September 2012, when Best Buy's board hired Joly—an executive from hospitality company Carlson with zero retail experience. At his first board meeting, Joly assessed the bleak state of the company: "This is the most dysfunctional organization I've ever seen," he recalls saying. "But this is good news because this is self-inflicted, and so this is something we can correct."

Joly hustled to do just that. Donning a signature Best Buy blue polo shirt, the new CEO spent his first week on the floor of a local store, gleaning insights and formulating a plan. He also did some power-networking: Early on, he went to Cupertino, Calif., to visit Tim Cook, CEO of Apple, one of Best Buy's biggest vendors. (Best Buy was the first outside retailer in the U.S. to carry the Apple Watch, and it now sells more iPads than Apple itself does, according to analytics firm Consumer Intelligence Research Partners.) As Joly recalls, Cook "was kind enough to say, 'Years ago, in the media, it was always "the

STILL SELLING AT A DISCOUNT

Best Buy's management has engineered a recovery, though profits and the stock price haven't fully rebounded.



BEST BUY'S CURRENT FISCAL YEAR ENDS JAN. 30, 2016.

GRAPHIC SOURCE: S&P CAPITAL IQ

beleaguered Apple." You're now "the beleaguered Best Buy," but there will be a good time after that.'"

In October, Joly paid a visit to Schulze, résumé in hand, to ask for his blessing. Schulze wasn't initially moved. But over the next few months, as he watched his successor unveil "Renew Blue," Joly's turnaround plan, it "was a confidence builder for me," he tells *Fortune*. By March 2013, Schulze had abandoned the takeover, and he soon returned to the company as chairman emeritus.

Joly found his right-hand woman in McCollam. A 5-foot-tall Midwesterner whose voice is soft but imbued with urgency, McCollam had turned around a losing vegetable department at Dole Food and executed a post-recession comeback at Williams-Sonoma. The day she announced she was leaving the latter company, its stock fell 6%. Her most recent Best Buy experience hadn't been good. In 2010 she'd placed an online order for a pink point-and-shoot camera for her niece, only to get a message that it would not arrive by Christmas—then spent 45 minutes on hold trying to cancel the order. (Her response: "I became an Amazon Prime member.")

Before McCollam accepted the roles of CFO and chief administrative officer, she toured 75 stores to diagnose the severity of the problems. She saw disrepair everywhere, from product displays to store restrooms—signs that the company had let maintenance lapse as it ran low on cash. The website was also broken; Best Buy didn't even show up on page 1 of search results when you Googled "video games." She sensed the company was in danger. "I would love to not be the cost-reduction queen," says McCollam with a sigh, but when the alternative was letting Best Buy and its employees' livelihoods disappear, it "forces you to be that way."

McCollam and Joly started cutting at headquarters. The private jets were the first to go, along with trips to the World Economic Forum in Davos. They've nixed NASCAR sponsorships and Super Bowl ads. They also targeted the small stuff. McCollam's approach was, "I don't need you to go find the million-dollar idea—I'd love for you to go find the $10,000 idea," says Corie Barry, chief strategic growth officer. Nowadays, there's nary a color printer at Best Buy's offices. The big-box retailer also literally made its boxes smaller, cutting back on expensive packaging that was dwarfing its devices.

Making a sprawling workforce more efficient was the next challenge. When McCollam walked into her first staff meeting, she recalls, she found herself in a half-empty room; it turned out many of her direct reports were working from home. On any given day, 20% to 35% of corporate employees would be absent. Best Buy ended its no-questions-asked remote-work policy in early 2013, just weeks before Yahoo made waves with a similar ban. Inbox clutter was another target. Managers were getting hundreds of emails a month with reminders to, say, boost credit card sign-ups or thwart shoplifters, depending on the suits' frustrations of the day. The instructions confused retail employees, who thought each new priority was "more important than actually growing revenue," says U.S. retail president Shari Ballard, a 23-year company veteran who now oversees all domestic stores.

The new leaders sliced out some of the extra cooks in the corporate kitchen, eliminating several layers of management; in all, some 2,000 people were laid off. (The overall staff currently numbers about 125,000, down from a peak of 180,000.) Employees now focus on the metric Ballard prizes most: revenue per hour.

Joly has empowered employees at all levels to act quickly and even unilaterally. "The difference between great leaders and good leaders is not the quality of their decisions. It's the quantity of their decisions," he says. One of Joly's biggest—and earliest—decisions came in 2012, when he committed Best Buy to matching Amazon's prices (as well as those of other major competitors). "This was a hard thing to do, because you have no idea what the financial implication of that is," McCollam says. "And you know you can never go back." The change has paid off, analysts say, helping Best Buy regain market share in several categories.

But to truly compete with its dotcom nemesis, Best Buy had to deliver products faster. In years past, items on BestBuy.com would often appear as "sold out" because they weren't stocked in the closest e-commerce warehouse; even in-stock items often took a week or more to reach customers. In spring 2013, McCollam upended that dynamic

BEST BUY ENTERS THE "CONNECTED HOME"

Best Buy wants to capitalize on the Internet of things—by selling connected products, and by making service calls to help consumers rig them up. Below, some of the chain's newer offerings.

Arlo (home-monitoring system; $180)
Netgear makes these night-vision security cameras, which send email or app alerts—plus relevant footage—when they detect motion.

Automatic (car diagnostics; $100)
Offering Tesla-like intel to normal drivers, this car computer plug-in interprets inscrutable "check engine" warnings and can call for help after a crash.

Hue Lighting ($200 for a starter kit)
Homeowners can use smartphones to control the timing, color and brightness of Hue bulbs– whether to scare off intruders or to set strobe effects for a dance party.

Petcube (pet-monitoring device; $200)
This personal puppycam streams YouTube-worthy moments to owners' mobile devices, and allows humans to talk to their pets and even play "fetch" with a smartphone-controlled laser pointer.

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by instructing 50 Best Buy retail locations to start shipping products to fulfill e-commerce orders. By early 2014 all of Best Buy's stores were also distribution centers—and delivery times improved drastically. This year, Best Buy has delivered 67% of its packages in two days or less, and averages shipping speeds faster than Amazon's standard (non-Prime) orders, according to retail analytics firm StellaService. Making in-store items available online unlocked an additional $2 billion in inventory for potential sales, says McCollam. The tech team, under Mary Lou Kelley, has also made BestBuy.com more crash-resistant, upgrading the site to a cloud-based infrastructure.

From Joly's point of view, shake-ups like these saved Best Buy; what's more, he says, with women in leadership roles, Best Buy's staff was more motivated to join in. "Men tend to be like horses. They see the goal, and they march," says Joly. "Women tend to care more about the group ... be more sensitive to the mood. Because you may arrive to the goal, but if everyone is, like, dead in the water, that's not a great outcome."

JUST BEFORE 10 P.M. on a Friday night, Best Buy's only round-the-clock location, on 14th Street in Manhattan, looks like a consumer-technology museum crossed with an arcade. The Internet-of-things presence is visible everywhere: One aisle, for example, features Nest's familiar trio of connected thermostat, smoke detector, and security camera, along with wireless "smart" lighting systems. There's also an exact replica of an Apple Store, with iPhones displayed on low wooden tables, and at an Intel exhibit a customer tries out a motion-sensing videogame that turns his own hands into joysticks.

In the new Best Buy, electronics manufacturers are increasingly staking out store territory for themselves. The "shop-in-shop" concept took off in 2013, after Samsung Electronics co-CEO JK Shin met with Joly and Best Buy chief merchant Mike Mohan on a stopover in Minneapolis. Shin was looking for ways to showcase Samsung's sleek new Galaxy smartphones. In the kiosk concept, he and the Best Buy executives saw a chance to help each other. The day Best Buy announced the partnership, its stock price soared 16%. In shop-in-shop deals, manufacturers invest millions of dollars with Best Buy—underwriting marketing and more attractive displays, and training sales staff—but still spend less than they would to build their own stores. Some analysts worry that Best Buy's dependence on its vendors may backfire if certain products go out of style. But so far, the partnerships have subsidized Best Buy's overhead and shored up its status as the electronics industry's biggest showroom.

Only in the past year have Best Buy's same-store sales finally increased again, and management gives considerable credit to Chris Schmidt. A year ago Schmidt was Best Buy's Colorado market director and was consistently growing sales, even as fewer customers were walking into his stores. His secret was a spreadsheet into which he had plugged employees' scores on all performance metrics Best Buy tracked. Realizing that none of the measures mattered if his staff wasn't closing sales, he sorted the spreadsheet to spot laggards to target for further education—perhaps they needed extra training on "smart" 4K TVs, or tips on conversation openers that wouldn't scare off customers. "Even tiny bits of movement yield massive amounts of return," Schmidt says of the behavioral tweaks, which could increase a single employee's sales by tens of thousands of dollars a year.

After seeing the Denver method in action, Ballard ran with it. By last Thanksgiving, she had taught all 2,000 Best Buy store leaders a data-driven training program they call Individual Sales Tracker. (She also promoted Schmidt to vice president of sales operations.) "What's the biggest difference, and why are the stores growing? I would say: That," Ballard says.

EVEN BEST BUY'S former adversaries laud its success. "They've done a terrific job, and they've had a lot to overcome," says James Marcum, the last CEO of Circuit City. Of course, Best Buy still faces the challenge of selling inherently cyclical products whose already low-margin prices decline over time. Analyst Chukumba, a bull on Best Buy, recognizes the headwinds. "People just say, 'Consumer electronics is a crappy business,'" he says, with Best Buy as "the best house on a bad block." Even as sales rebound, Wall Street is pressing Best Buy to shutter more stores to cut real estate costs. (Management has closed only nine big-box locations since the turnaround began, saying its stores are more profitable than people realize.)

In such an environment, maintaining morale is among the biggest challenges. When Kelley woke Joly last Black Friday to tell him the website had gone down, she wondered whether the gaffe was a fireable offense. To Joly, however, Kelley was demonstrating his ideal problem-solving approach, one with which men, he says, often have a harder time: "Bad news has to travel at least as fast as good news." To encourage this, Joly has been known to pass out his cellphone number to store staff, who stop to take pictures with him when he visits. And these days he's cheering and prodding those team members as they prepare for the upcoming holiday season—when they'll face pressure to raise the bar yet again. "Let me be clear: This is a terrific, amazing comeback," Joly tells *Fortune*. "But it's a game that's never over."

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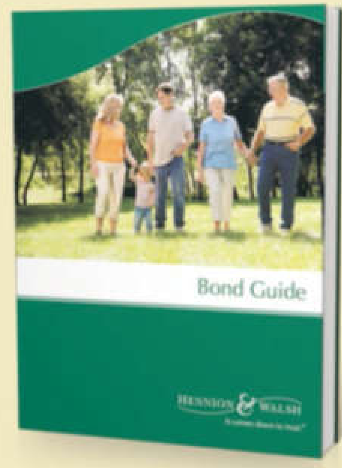

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CONNECTING VETERANS WITH CAREERS

FORMER MILITARY PERSONNEL AND THE BUSINESSES WHO NEED THEM BENEFIT WHEN SCHOOLS AND COMPANIES WORK TOGETHER.

EVER SINCE PROTESTS AGAINST THE VIETNAM WAR SHUT DOWN its New York City campus in the late 1960s, Columbia University has had a hard time shaking its anti-military reputation—even though its School of General Studies was created in 1947 largely to address needs of servicemen returning from World War II. Today, the university is once again recognized as an institution deeply committed to veterans—not only providing them a higher education but partnering with organizations and companies to help them attain civilian employment and leadership roles. The university, says Curtis Rodgers, vice dean of General Studies, where the majority of Columbia's 600 veteran students are enrolled, helps them transition "not only into the academic world, but into what happens after it, too."

Across the country in San Diego, the same "focus on progression to career" prevails at California State University San Marcos, says Navy veteran Patricia Reily, who since becoming its first veteran services director a year ago has forged a partnership with the Northern San Diego Chamber of Commerce: "We're constantly looking at, what does our community need? That's what we need to provide."

Michael Betancourt has benefited from that kind of thinking. After leaving the Marine Corps in 2012 and attending San Marcos, the 34-year-old disabled veteran and self-professed entrepreneur is thriving. He drew on the school's strong veteran support to land a fellowship through the Mission Continues, a nonprofit that connects veterans with community volunteer projects. That led to a role at an accelerator, Vet-Tech, that helps veteran-led startups scale their ventures, and an IT manager job at biotech company Illumina. "Most veterans want to do something bigger than us, to change the world," says Betancourt. "I get to work for a company that's transforming healthcare, including the fight against cancer, while keeping a foot in the entrepreneurial scene."

In today's competitive, skills-driven environment, aligning education and training with employer needs is crucial, and particularly so for vets, whose military competencies are valuable in the civilian arena but often don't easily translate as such, says Daniel Nichols, senior vice president of Victory Media, which provides tools for veterans seeking work and helps corporations connect with them. "There's a tremendous amount of confusion about how what you learn skill-set-wise in the military translates into the civilian workforce," says Nichols. "The thinking is we'll take your specialty area one-to-one and you end up with a lot of mismatches. There are no clear pathways." Snipers and explosive ordnance specialists, for example, may incorrectly assume they're qualified only for similar work. However, they're capable of leading small teams in high-pressure situations, have demonstrated attention to detail, and can work under strict deadlines without supervision—attributes prized by civilian employers.

According to Nichols, helping vets identify and articulate what they bring to the table—and helping employers understand it—is key to securing jobs for the more than 250,000 service members who leave the military each year. While post-9/11 veteran unemployment dropped below 5% for the first time in August, force reductions in coming years will lead to a swelling population of veterans

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THEN AND NOW: Veteran Kelsey Koningsor, on a security detail while deployed in Iraq in 2010 (left), and at her graduation from USAA's VetFIT program with Col. Miguel Howe, a guest speaker at the event (right).

"pursuing education or civilian careers," he says. "As military departments scale down, I hope we don't lose the momentum we've had for supporting the military and their families."

Each year Victory Media evaluates educational institutions and employers to calculate its Military Friendly® ratings, conferred on those that make an exceptional effort to recruit, retain, and support veterans. Cal State San Marcos has received the designation; so has Columbia, which quickly and enthusiastically embraced the Yellow Ribbon Program created by the Post-9/11 GI Bill that, in 2009, made higher-priced private institutions more financially accessible to veterans. Among Columbia's efforts to help transition its vet students is a partnership with Moody's Investors Service that provides scholarships, including internships and networking opportunities.

Among Military Friendly® Employers, USAA is a standout. The financial services organization makes sure vets and military spouses comprise 30% of its annual hires and maintains a robust slate of veteran-focused programs, one of which has made a huge difference in Kelsey Koningsor's life. After the 26-year-old signals intelligence analyst left the Army this year, she felt "a little frantic. After you're out of the military, nobody's there to help you. You're on your own." Then she talked to one of her former first sergeants, who'd been hired by USAA, and applied to VetFIT, the company's competitive Java software development training and internship program.

"I'd never seen a line of code—it was terrifying," says Koningsor, who nevertheless mastered the challenge and in September joined USAA's IT team at its headquarters in San Antonio. "The military instills into you hard work," she says. "If I was just straight out of high school, I don't know if I would have had that drive."

Jackie Purdy, vice president for talent at USAA, is inspired by that drive as well as the education of vets: "Everyone assumes that vets just bring soft skills to the table—leadership, troubleshooting, logical thinking—but we forget that the military is a highly educated force that brings hard technical skills to the corporate world."

Only three in 10 applicants are accepted into the armed services; many successful applicants go on to gain highly marketable STEM skills. "A combat engineer in the Army for eight years is much more qualified than your typical four-year graduate who's never had any practical experience," says Andrew Schwartz, a former Marine who now heads Virginia's V3 (Virginia Values Veterans), a government training and certification program with a successful record of helping employers hire veterans. "We're very interested in making sure we capitalize on this highly trained resource. Hiring vets is a solution to business needs, veteran needs, and community needs."

PHOTO (RIGHT): DAWN WOLFF

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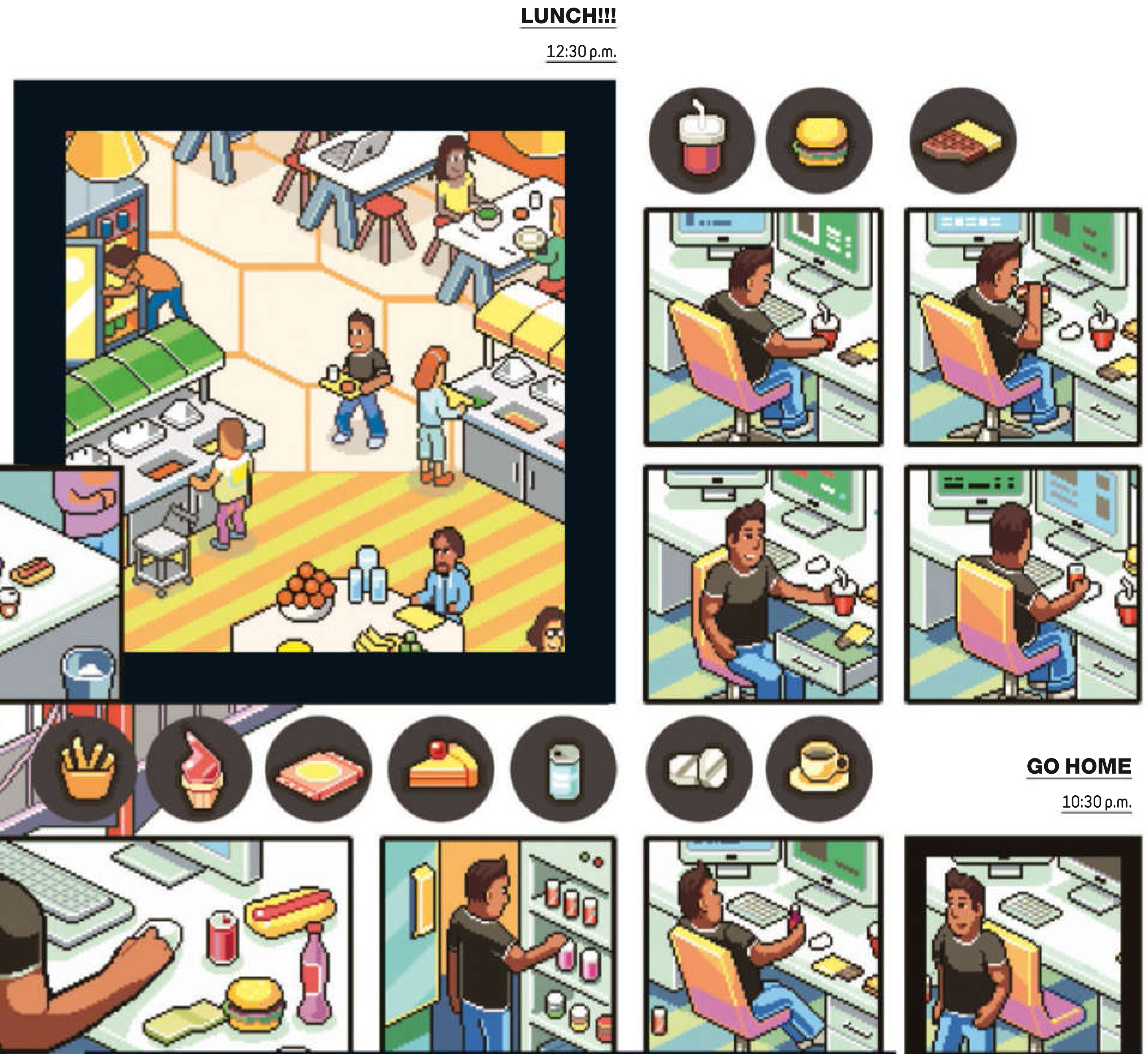


Is Silicon Valley Bad For Your Health?

By Jeffrey M. O'Brien

GRUELING HOURS. STRESS. JUNK FOOD AND RED BULL. OBESITY IS RISING IN AMERICA'S ECONOMIC FRONTIER, AND THE CONSEQUENCES—DIABETES AND HEART DISEASE—COULD BE DIRE.

ILLUSTRATION BY SERGEY KOSTIK

NEARLY FIVE YEARS AGO, the global health organization AmeriCares started a mobile clinic in the chaotic slums of Mumbai, where sanitary facilities and running water are limited and entire families sleep in a single room. Throngs of residents who simply can't afford bus fare to a local hospital line up outside roving vans to receive treatments for a host of respiratory and gastrointestinal disorders. Around the same time, the so-called Health Wagon began traversing rural Appalachia, offering screening for diabetes-related eye disease to malnourished mountain dwellers.

Since these innovative programs took root, mobile clinics have blossomed around the world to provide health care to those who are unable to procure such services themselves. According to the *American Journal of Managed Care*, there are now nearly 2,000 such programs in the U.S. alone. Most of the millions of patients are homeless, disenfranchised, displaced, or uninsured. Most. But not all.

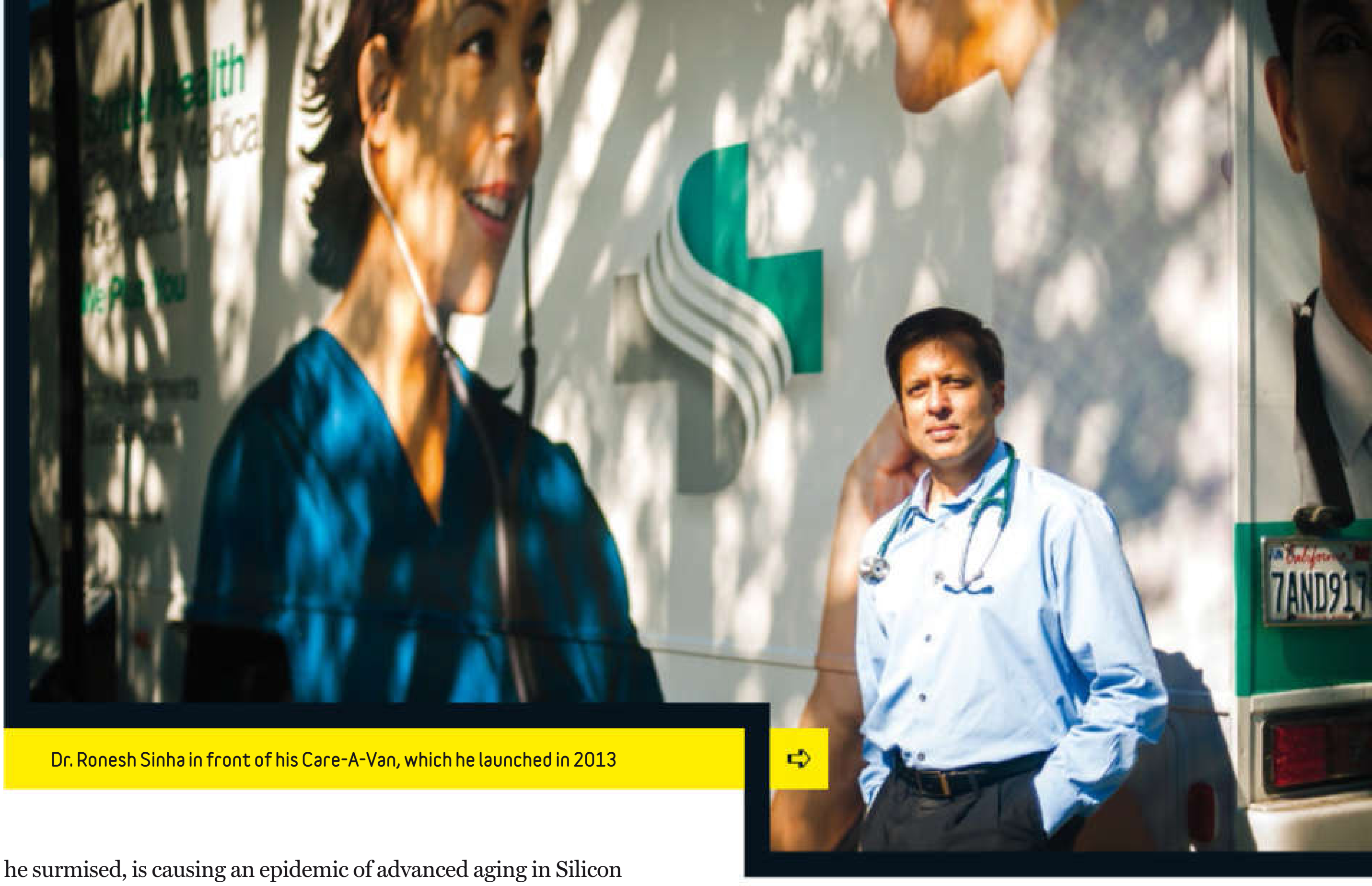
On a late-summer afternoon in Northern California, another mobile clinic is stationed in a more improbable location: among the BMWs and Teslas in the parking lot of the highly groomed corporate headquarters of Nvidia, a graphics semiconductor titan in Santa Clara County, home to the nation's highest median household income. The estimated average annual salary on this campus: roughly $130,000. And yet there's a sparkling 37-foot RV with two exam rooms and a lab. It bears the markings of the Palo Alto Medical Foundation (PAMF), a nonprofit with 15 offices in the Bay Area.

The Care-A-Van, as it's called, serves more than a dozen of Silicon Valley's largest employers, including eBay, Juniper, Oracle, PayPal, SanDisk, and VMware, as well as Nvidia. Inside, the on-duty physician, Haleh Sheikholeslami, explains that she has had some dramatic encounters during two or so years on wheels. She has diagnosed a few heart attacks and recently dispatched an engineer complaining of chest pains to a hospital, where he immediately received four arterial stents. Mainly, though, the diagnoses are more routine, at least until you consider that the average age of her patients is under 40. She sees mental-health issues associated with chronic stress and anxiety, from rashes and irritable bowel syndrome to full-on depression. Many patients are deficient in vitamin D—in a climate that sees 260 days of sunshine per year—and have eye, back, and other muscular complaints related to repetitive motions and a lack of physical activity.

Most of all she sees cholesterol problems, high blood pressure, and elevated triglycerides, all stark signs of an increased risk of diabetes and heart conditions. "They get what we call metabolic syndrome," says Sheikholeslami. "They're overweight. The good cholesterol is low, their triglycerides are high, and that leads to a variety of issues." Unlike most mobile-clinic visitors, nearly every Care-A-Van patient has health insurance. A full 40%, however, don't have a primary-care physician. For some, that's because they're immigrants who haven't bothered to navigate the U.S. health care system. Others just can't break away from the workload. Some patients don't even get off their mobile devices while being examined.

Ronesh Sinha, an internal-medicine physician and PAMF's director of employer health services, enters the RV and picks up the thread. "You'd think when you go to companies that offer great health insurance, on-site gyms, and extensive wellness programs that you wouldn't be seeing the issues we're seeing," he says. "But people are so freaking busy they can't even imagine going out to the doctor."

Sinha, who specializes in health and wellness issues with a special interest in Asian, and in particular Indian, patients, started the Care-A-Van in 2013 after he noticed some alarming trends. First, he was seeing far fewer patients than what he considered normal. Next, the patients he was seeing had bodies that didn't match their age. A toxic cocktail of poor nutrition, sleep deprivation, and stress,



Dr. Ronesh Sinha in front of his Care-A-Van, which he launched in 2013

he surmised, is causing an epidemic of advanced aging in Silicon Valley. He tells of a 34-year-old programmer who came in complaining of neck pain. X-rays revealed severe degenerative arthritis caused by poor posture, insulin resistance, tissue inflammation (a result of the insulin resistance and a diet high in processed carbohydrates and sugars). It was the type of affliction a doctor would typically find in someone around 70. Sinha says he commonly sees 30-year-old engineers with 50-year-old bodies, complete with potbellies, curved spines, dulled skin tones, joint issues, reduced vitality, and elevated risks of diabetes and heart disease.

He was also noticing that Asian patients were faring worst of all. As an Indian-American, Sinha is acutely aware of the prominence of Asian workers in the Valley. He used to struggle with his weight and health, so he knows firsthand that the Western metrics don't always apply. Many studies have demonstrated that Indians, despite being nominally less obese than other ethnicities, have a higher risk of diabetes and heart disease. Part of the problem is that they tend to carry weight differently than Westerners; they have thinner arms and decreased musculature. As a result, their body mass index, or BMI, tends to be lower, causing them to fall under the radar. But Indians have a higher propensity for belly fat, which is the most dangerous kind. For all these reasons Sinha decided to borrow an innovation from the most marginalized populations of humanity and roll it out on the gilded streets of Silicon Valley.

Sinha—or Dr. Ron, as he's known—

is a whirlwind. Aside from his work with PAMF, he maintains a private practice. His exercise routine, including high-intensity sprinting, and a nutrient-dense, low-carbohydrate diet account for his trim figure. He wrote the *South Asian Health Solution,* a book that offers accessible explanations of nutritional science along with diagrams for how to achieve the perfect forearm-side-plank yoga pose. He's got a blog and three ebooks, he's given two TEDx talks, and he's a regular on the Valley lecture circuit, where he hosts standing-room-only discussions on such topics as "How to Prevent a High-Tech Heart Attack."

Sinha is quick with anecdotes to demonstrate the outsize incidence rates in tech companies of everything from high-risk pregnancies to autoimmune disorders. But at a certain point, anecdotes aren't enough. Everyone in the Bay Area seems to know someone who works 18-hour days, looks like a zombie, and relies on Red Bull, Adderall, or even cocaine during the sprints to make a deadline. But hearsay doesn't make an epidemic. So I ask Sinha for hard data, and he invites me down for another visit.

We meet on the back patio at a Cupertino Starbucks. After some small talk, he hands me a seven-page document detailing the results of a biometric screening performed at one of PAMF's clients. We agree to keep the company anony-

GETTY IMAGES

PHOTOGRAPHS BY **BRIAN FRANK**

The medical van open for patients outside the offices of SanDisk in Milpitas, Calif.

mous. Suffice it to say it's a large Silicon Valley employer. Sinha assures me that the demographic makeup of the participants is typical of the rest of his clients. And so are the results.

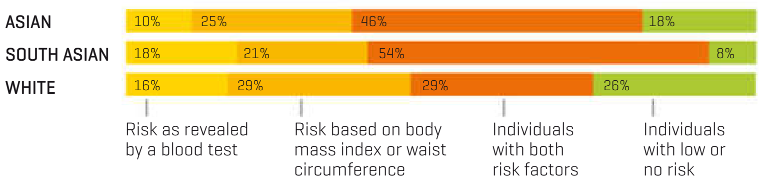
The screening tested nearly 500 employees, primarily in search of insulin resistance, a condition that prevents the body from properly processing the hormone that promotes the absorption of glucose from the blood into your cells. In insulin-resistant bodies, the insulin and glucose are repelled by cells. Rather than being used by muscles for energy, the glucose is redirected to fat cells. There is no universally accepted cause, but there is plenty of published evidence that obesity plays a role. Overweight people become more resistant, which causes them to become fatter in a vicious cycle. Sinha and others make a convincing case that the primary culprit is a diet high in processed carbohydrates and sugar. Many studies have also demonstrated that insulin resistance is triggered by stress, sleep deprivation, and a dearth of physical activity.

Viewed in that light, the typical tech company looks like a perfect breeding ground for insulin resistance. Employers often provide copious amounts of processed, sugary, high-carb snacks, energy drinks, and soda as a perk to workers, often for free. Employees sit at their desks all day and into the night. And of course, everyone is crazed about a deadline and competing like hell to keep up or get ahead. The effect is unsurprising. Remember the "freshman 15" from college? In the Bay Area, people talk about the "Facebook 15" and even the "Twitter 20."

RISKY BUSINESS

A screening of some 500 employees performed by the Palo Alto Medical Foundation at one Silicon Valley company showed many signs of future disease.

RISK FOR DIABETES AND HEART DISEASE *Due to rounding, percentages may not add up to 100%*



Most commonly, doctors look for increased levels of LDL, the so-called bad cholesterol, when examining for risk of heart disease. Sinha emphasizes another measurement. "The LDL measured on a standard cholesterol test is not what's causing most of the heart disease," he says. "Heart disease is far more complex, and the root cause is inflammation." So PAMF focuses on the ratio of triglycerides to HDL—the "good" cholesterol—while plotting ethnically adjusted BMI and waist-size statistics. This shift in lenses has a remarkable effect on outcomes.

When only LDL is looked at, roughly 25% of Caucasian participants in Sinha's screening demonstrated borderline-high or high levels of cholesterol. For Asians and Indians, the number is 19%. But viewed through the triglyceride-to-HDL lens, 30% of Caucasians are in the danger zone. For Asians, it's 40%. Indians have the worst percentage of all: 55%.

When all the factors—blood pressure, cholesterol and triglyceride levels, waist circumference, and BMI—are considered in combination, the numbers are even grimmer. Nearly 75% of Caucasians in the survey have at least one risk factor for diabetes or heart disease. Among Asians, it's 81.8%. For Indians, 92%. This is no small affair considering that more than half of the Valley's tech workers are Asian.

GRAPHIC SOURCE: PALO ALTO MEDICAL FOUNDATION SCREENINGS

> "PEOPLE ARE ASKING ME FOR A COMBINATION PRESCRIPTION: RITALIN AND XANAX. ONE SO THEY CAN PERFORM DURING THE DAY AND THE OTHER TO KNOCK THEM OUT AT NIGHT."

Those numbers aren't quite as stratospheric as they might seem to a layperson—but they're still telling. Or so I discover when I share Sinha's numbers with four epidemiologists and public health experts. Americans overall have high risks for diabetes and heart disease. But there's a crucial caveat. "In the general population in the U.S., diabetes and cardiovascular disease are associated with low education and incomes," says Adam Drewnoski, a professor of epidemiology and director of the Center for Public Health Nutrition at the University of Washington. Sinha's findings, as we've seen, are drawn from some of the most educated and affluent people in the country.

I get a similar response from Robert Lustig, a professor at the University of California at San Francisco, an expert in pediatric obesity and diabetes, and the author of *Fat Chance: Beating the Odds Against Sugar, Processed Food, Obesity, and Disease*. Referring to a recent diabetes study that focused on Indians (and used different methodology), he says, "The percentages in the Silicon Valley sample seem much higher. You would think an educated population would do better. But not necessarily. The people in Silicon Valley are eating a terrible diet of processed and sugary foods, and Asians and Indians can least afford to do this."

Sinha's conduit to his clients is human resources. But none of his HR contacts would talk for this story. Instead, I speak with Lisa Yee, executive director of the Silicon Valley Employers Forum, which represents HR-benefits directors at 40-odd Bay Area companies, from Adobe to Yahoo. Yee says many wellness programs aren't working. "I've talked to every one of the high-tech firms, and this is their No. 1 priority," she says. "'We offer a plethora of programs, but they're not getting the traction we'd hope given the investment we're making.' That's what I keep hearing."

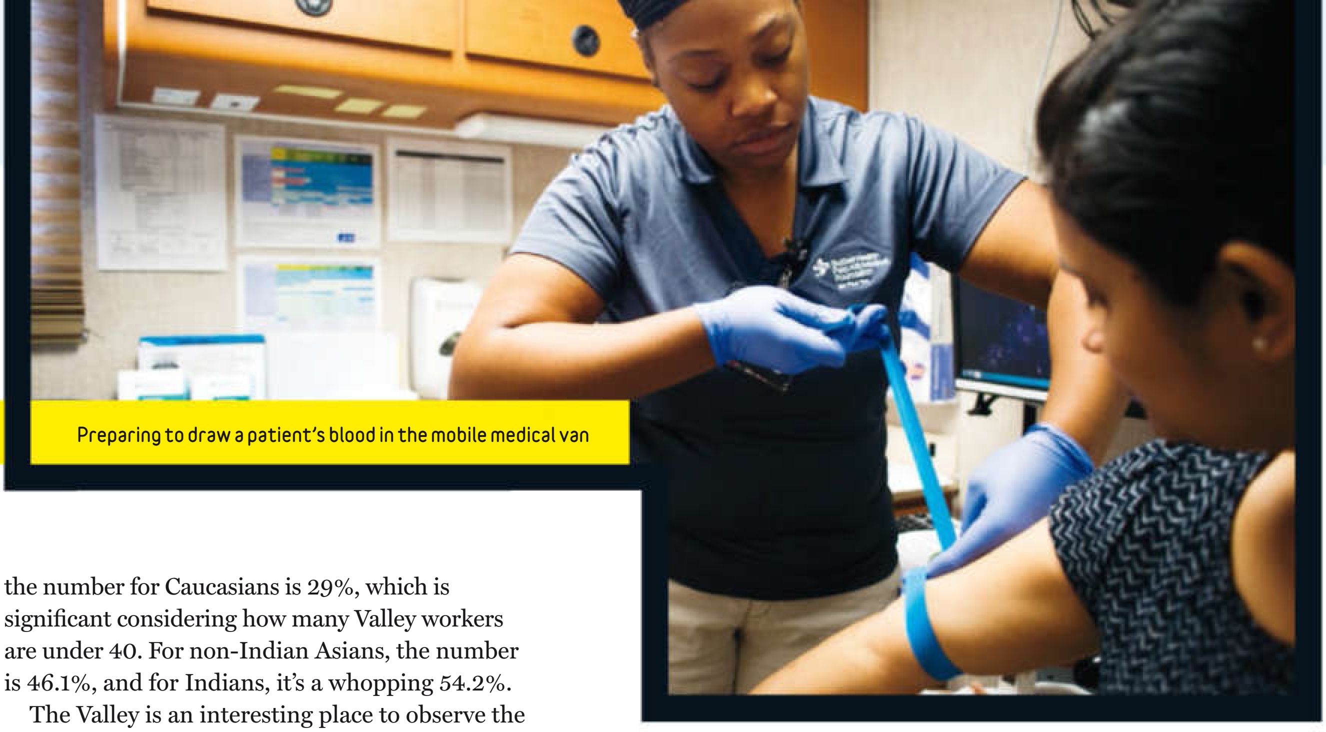
Yee says there's a lot of blame to go around. For all the talk in the Valley about the power of big data and analytics, some of her members are guilty of not adequately measuring the efficacy of wellness programs, which seek to encourage healthy habits among employees (more on that later). And then there's the Valley's productivity-first culture. "I really believe a case in point is Yahoo," Yee says. "So Marissa Mayer is going to have twins. That's great. She can have a career and have a family, and she can obviously afford all the care at home to take care of those kids. But working right up until the end of her term, what message is she sending? Is it that productivity is what really matters? That's counter to what HR is trying to provide, a work-life integration and balance."

A lack of that balance can have many ramifications. So says my Bay Area doctor, Bertrand Vandeville. After a recent exam I asked what kinds of issues he's been seeing lately. "People are coming in asking me to fill a combination prescription: Ritalin and Xanax. One so they can perform during the day and the other to knock them out at night," he says, making me feel less guilty about my own coffee and wine routine. "And there are a lot of young people in their twenties and thirties who get these prolonged respiratory issues in the winter. You're not supposed to be sick for weeks at a time, but that seems to be becoming more normal. It's all stress related."

Stress triggers the body to release cortisol, a hormone that can make you feel hungry and crave junk food, which boosts insulin resistance and abdominal fat. Heart disease may be the most dramatic manifestation. "But for other folks it's just depression," Sinha says. "I see people who have no reason to be depressed. No family history of depression. Their marriage is fine; their finances are in order. But the stress overcomes them. For other folks, it's chronic pain or gut-health issues. All these things are clearly lifestyle induced."

Sinha's data

got me wondering whether the Centers for Disease Control and Prevention is clued in to this phenomenon in the Valley. When I ask a CDC official to dissect the PAMF screening, I'm told it's against agency policy to comment on private data. Indeed, comparing Sinha's findings to CDC reports seems nearly impossible, and his data team argued against it. For starters Sinha uses ethnically adjusted metrics; the CDC doesn't. His tests employ a higher threshold for hypertension and don't require participants to fast for 12 hours before taking a glucose test (which is seen as important when testing one individual but is impractical in doing a companywide screen). Despite those significant caveats, a rough comparison gives at least a sense of scale. According to the CDC, in 2012, 35% of all U.S. adults and 18% of those under 40 had at least three metabolic risk factors. In Sinha's screening,



Preparing to draw a patient's blood in the mobile medical van

the number for Caucasians is 29%, which is significant considering how many Valley workers are under 40. For non-Indian Asians, the number is 46.1%, and for Indians, it's a whopping 54.2%.

The Valley is an interesting place to observe the spread of such conditions. If the affluent, educated people here are succumbing, it says a lot about the dramatic and deleterious health effects of a desk-centric, high-stress lifestyle. Another reason the Valley makes an interesting petri dish is the tendency here to turn problems into opportunities. Countless brilliant students, entrepreneurs, scientists, and capitalists flock here to optimize systems and profit from the improvements. So perhaps as these issues emerge, so, too, will solutions that guide the rest of the culture.

Most Silicon Valley companies already have some type of wellness program. They vary greatly in execution and effectiveness. Some feel half-hearted: perhaps a 10-class yoga series in a conference room and stress and diet advice on the company website, along with a regular "healthy" option in the cafeteria and maybe a gym. Dr. Jordan Shlain, who sees patients in San Francisco and the Valley, dismisses such efforts. "There's zero evidence to show that corporate wellness programs do anything for health at all," he says.

A few Bay Area companies, including Applied Materials and Facebook, are more engaged, making health and wellness options as accessible as snacks typically are. They've deployed elaborate on-site health centers with the help of Crossover Health. Facebook's wellness center offers primary, urgent, and online care, as well as physical therapy, chiropractor and acupuncture services, and various health-education and behavioral health services. Having a world-class facility right on campus seems to boost engagement dramatically. "Of the eligible Facebook employees, 65% have used the health center," Crossover CEO Scott Shreeve says. "The center is typically oversubscribed."

Apple has a center too—also managed by Crossover—which comes off as more of an Apple Store than a doctor's office. During an interview last year with *Fortune,* Apple's head of HR, Denise Young Smith, said that 43,000 employees had visited one of seven on-site doctors during the first year and that the center has an average wait time of less than five minutes, as well as a team of chiropractors, physical therapists, and dietitians. Shreeve says that workers who use the centers his firm manages make noticeably fewer visits to emergency rooms and are dramatically less likely to be hospitalized than their peers at the same companies.

There are also a raft of companies trying to solve health issues through digital means. Chief among them, perhaps, is Omada Health, which in September added a $48 million third round of financing to fight obesity-related chronic disease, which is estimated to cost the economy $500 billion a year. Omada is working with employers and insurers to offer its diabetes-prevention program as a standard of care. Omada mails each member a digital scale with a cellphone chip to log weigh-ins automatically, and pairs each individual with a health coach for a 16-week curriculum to create a more sustainable lifestyle. "The goal is to help you lose the right amount of weight in the right sort of way that science shows can have an impact on your health and diabetes risk," says Omada co-founder and CEO Sean Duffy.

Duffy says there's a rising tide of obesity-related consequences in California. He points me to the annual "State of Obesity" report prepared by the Trust for America's Health and the Robert Wood Johnson Foundation. In 1990, less than 10% of Californians were obese. Last year the figure was almost 25%. The amount of obesity-related cancer here is projected to more than double in the next 15 years, according to the report, and heart disease is expected to quadruple. "Even a couple years ago there was

> "COMING OUT OF FACEBOOK," MOSKOVITZ SAYS, "A LOT OF PEOPLE GOT BURNED OUT. NOW THEY'RE JUST NOT CONTRIBUTING TO THE ECONOMY."

a general attitude that this was other people's problem. But it's here now. It's in the home base," says Duffy. "It behooves Silicon Valley companies to look at themselves in the mirror."

I'm sitting across the table

from, oh, let's call it roughly $10 billion in net worth. Most of it belongs to Dustin Moskovitz, one of the co-founders of Facebook and the former Harvard roommate of Mark Zuckerberg. Justin Rosenstein hasn't done too badly either. He started his career as a product manager at Google, where he invented Google Drive and Google Chat. He was then lured to Facebook by Moskovitz to lead the technical team that invented the ubiquitous "like" button, among other projects.

Moskovitz and Rosenstein made their fortunes on the backs of breakneck work cultures, and now they're feeling some regret. Here's Moskovitz, recounting Facebook's early days. "Work was at the center of our lives. We weren't necessarily trying to deliberately craft one of these Amazon-like cultures that are so extreme, but it was sort of the way of the Valley," he says. "We just got sucked in, and it had a bunch of negative health consequences on me as a result." Physical? Mental? "Yes. Yes. Both. Back problems and just general unhealthiness. I gained a bunch of weight, wasn't fit, and I'd get winded if I went up the stairs too quickly," he continues. "The Facebook meal plan was reasonable, but we had a lot of unhealthy foods stocked. So I would eat some form of candy probably every day. Lots of soda. Probably more soda than water." For his part, Rosenstein had worked 65-hour weeks at Google. "It was starting to take a toll," he says. "I was pretty miserable for a lot of that time."

Moskovitz and Rosenstein left Facebook in 2008 to start Asana, which makes software to facilitate teamwork and boost productivity while minimizing email. We're sitting in the company's headquarters in San Francisco's Mission District, discussing the philosophy of Asana's culture, which they conceived around the time they were trying to recruit old friends and colleagues. "Coming out of Facebook, a ton of people got burned out. To me, that's kind of a tragedy, because we invested in these people and made them better," says Moskovitz. "And now they're just not contributing to the economy." Adds Rosenstein: "It's amazing how many people were just like, 'I can't work any more.'"

The duo decided to tackle the problem by crafting a more mindful and, they hope, sustainable way of working. They call it the Asana Way. Rosenstein shares a three-page outline detailing its tenets. Some are awfully squishy, à la "Hire egoless people" and "Don't work ridiculous hours (but can when need to)." But others are thought provoking. One especially enlightened policy has to do with responsibility allocation. In a typical culture, a designer, for example, would create an asset and run it by the boss for approval. At Asana, the boss works more as a mentor or an adviser. Which means Rosenstein provides feedback, but the designer can choose whether to take it. "Often they'll take my advice because they respect me. But if they disagree, they make the call. Of course I can, you know, relieve them of their responsibilities, but short of that they really are the empowered decision-maker," he says. "There's tons of times when I don't get my way. But in the long run that leads to a culture in which people really feel in control of their destiny. So we can hire better people and retain them for longer." The phenomenon is not exclusive to Asana: Many studies link having a "high control" job—one that offers autonomy—to good health.

The Asana Way emphasizes transparency. Most financial details are shared throughout the company. It also attempts to minimize meetings (never on Wednesdays, for example) but encourages employees to dine together to boost camaraderie. Breakfast, lunch, and dinner are served three days a week in a sleek dining room, and the in-house culinary team emphasizes fish, chicken, and vegetables with no processed carbs or dessert. Physical and mental health are priorities. There's yoga every day, and top executives routinely attend. Moskovitz says he has pushed employees to take vacation or exercise more. Each employee is provided with a standing desk, an ergonomic consultant, and $10,000 to optimize a workstation.

Above all, the Asana Way is about balance. Rosenstein clearly has a New Age streak and talks a lot about mindfulness. He meditates nearly every day, sometimes in the office. But he says he was also highly influenced by the *Power of Full Engagement*, a 2005 management book by Jim Loehr and Tony Schwartz about optimizing productivity through

awareness and work-life balance.

Not everything has gone perfectly. One early principle was to avoid titles in hopes of breeding a more meritocratic environment. But Moskovitz and Rosenstein have lately realized the folly of empowering a recent graduate with as much authority as someone with a decade's experience. So they're rethinking that policy. But overall this holistic approach to building a healthy work culture seems to be paying off.

Moskovitz and Rosenstein have no hard evidence, but anecdotally staffers have told them they are in better shape and less stressed out. Asana recently hired a consulting firm to conduct an employee-satisfaction survey. According to figures Asana showed me, the company scored in the 98th percentile on employee engagement. They cited empowerment, values, and communication as the three biggest drivers. (The company's actual business is doing well too. Asana claims to be one of the fastest-growing software-as-a-service companies in history, with more than 140,000 customers.)

For Moskovitz and Rosenstein, the personal returns have been positive as well. Rosenstein says he's down to 50-hour weeks. As for Moskovitz's back? "It hardly hurts at all," he says.

I've been reporting

on Silicon Valley for two decades, through good times and bad, and I felt as though I had heard just about everything. And then one day Sinha characterizes the plight of the Valley worker in a way I never would have considered. "The extent of human suffering here," he says, "is pretty intense."

It made me wonder. Have I been missing the signs? Are people here secretly unhappy? So I call the employer-review site Glassdoor. It doesn't measure happiness per se, but it does rank attitudes toward "work-life balance" and "compensation & benefits." I ask it to assemble a report comparing the rankings at 40-plus Valley firms with those at Manhattan financial firms, Detroit automakers, Philadelphia legal firms, Boston health care companies, etc., and another report comparing Valley tech companies with tech companies in Seattle, Boston, New York City, and elsewhere. The results reaffirmed my instincts. With a few exceptions, the firms in the areas around San Francisco and San Jose show up near or at the top. Even with all that suffering, people in the Valley think life is good. But why?

Maybe it's because they're getting exactly what they had signed up for. They're well paid, intellectually stimulated, and surrounded by people who feel as though they're working for a cause. If they have a few strong objections about a lack of work-life balance, maybe they never expected such a thing. They arrived fully aware of the intensity and demands, presuming to throw themselves entirely into their work, to sleep under their desks or not at all. Besides, many of their needs are accounted for. Their hair is cut, their dry cleaning delivered, their transportation provided. Then there's all the food. Silicon Valley has long been a locus of desk work and high stress. But the cornucopia of food is relatively new. Google started offering its famous free spreads in 1999, toward the end of the dotcom boom. In this latest economic explosion, many others have followed suit. Food has become both a recruitment tactic and a way to keep workers on campus and boost productivity. It may also be precisely what has, ahem, tipped the scales to make Silicon Valley's work culture unsustainable.

In the 2009 book *The End of Overeating,* former FDA commissioner David Kessler explores the biological effects of energy-dense, "highly palatable" foods. These foods, he writes, stimulate the brain's opioids, also known as endorphins, a process similar to the one incited by morphine and heroin. "In addition to their stimulating effects," he writes, "the opioids produced by eating high-sugar, high-fat foods can relieve pain or stress and calm us down." Kessler, who took on Big Tobacco in his FDA tenure, directs his glare to big food companies. But in this case, assuming the findings of Dr. Ron and his contemporaries are as scary as they seem, the tech companies themselves deserve blame as well. In optimizing a work culture in the name of productivity, they appear to have minimized the importance of humanity.

In my final conversation with Sinha, I ask whether he considers Silicon Valley a dangerous place to work—because the picture he paints is of a ticking time bomb. He pauses for a moment and tells me I need to understand his perspective. Most of the people he's seeing are the ones who are reaching out for help, the ones who are suffering. And then, "I guess in some ways, it is. But the way that the time bomb is going to explode is different in each person," he says. "We have the impression that urgent conditions will present themselves in an urgent way. But most people don't have television-style heart attacks. In a lot of cases it's low-grade conditions that have been there for a while. The problem is when we're this busy, we can just put that on the shelf and attend to our meetings, because work is always No. 1."

Jeffrey O'Brien is a former Fortune *senior editor and co-founder of StoryTK, a Bay Area studio that crafts stories for companies.*

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WHILE YOU WERE OUT

The Clown Show at VW

Do Volkswagen execs hate polar bears? If not, just what were they allegedly thinking? *By Stanley Bing*

SO YOU ASK YOURSELF, What in the world were those guys at Volkswagen allegedly thinking? I'm using the word "allegedly" here not about what they allegedly did but about their thinking, which was most certainly alleged. These *menschen* structured an ambitious effort to jigger the hardware and software of millions of vehicles over a period of seven model years in order to be able to claim they were greener and more efficient than they were. Plotting? Sure. Executing their nefarious scheme with precision and technological excellence? *Jawohl.* But thinking as you or I would use the word? *Nein.* This goes way beyond that.

Why does this kind of thing happen? When you see dishonesty and deceit pursued as a business strategy, you can't simply say that the people involved are just a bunch of crooks. That's too simple. So let's look at the possibilities.

They're a bunch of clowns. Well, possibly. But if so, they're very serious clowns. And there are a lot of them pouring out of that VW Beetle.

They didn't know about it. I'm going to dismiss this one right now. Corporate citizens don't implement a massive plan to break significant laws without knowledge in a chain of command. Particularly *German* citizens.

They didn't know it was wrong. Huh? They were offering the world vehicles that at times exceeded ecologically responsible levels of emissions by 40x. You don't have to be a polar bear floating out to sea on a tiny ice floe to know there's something wrong with that.

They don't care about polar bears. Let's be kind. There must be individual VW employees who care about individual polar bears, but as a group it's possible their concern for endangered species being wiped out by carbon gasses was extinguished and replaced by other emotions. Like greed.

Greed? Really? Sometimes the simplest explanations are the most credible. Still, this doesn't feel like enough. They had to know this would cost them at some point down the road, unless…

They thought everybody else was stupid. I'll buy that. Corporate arrogance is not unheard of, nor is the belief that one's intelligence is superior to that of others.

They did it because they could. Now we're getting somewhere. Mad scientists in white coats don't build monsters only in movies. Did we really need a hydrogen bomb? How about a method of editing genes to create a new species of *übermenschen*? They're doing that today, although not at VW.

They were actually proud of the engineering skill it took to pull it off. Of course they were. I guarantee you champagne corks were flying.

They're in a desperate fight for market domination that ruptured their normal sense of right and wrong. Yep. The company was facing rules and regulations that might have interrupted their ambitious drive to be No. 1 in the world. With the proper senior officers in charge, virtually any actions would be justified by the greater good that was being achieved.

So they're operating on an ethical framework in which what they're doing is actually right, in a way? Yes. That's generally what people tell themselves when they ignore reports saying their oil rig will explode soon, or jump a turnstile, or hawk a security their firm is betting heavily against. Nobody really ever thinks, I'm going to do something wrong now. There's always a rationale. Sometimes a divine one.

Maybe they thought they could get away with it forever? Yeah. I bet they did.

And they figured they would be able to handle it if the thing blew up. Of course. People always tell themselves that.

Still, if you add up all these things, there is a moment when the guys in charge look at one another and say, "*Achtung,* baby," and pass the good news down the line. And that defining moment is what separates those who cheat, lie, and steal from those who don't.

So they're crooks, right? I guess so. Now tell me something we didn't know.

Follow Stanley Bing at stanleybing.com and on Twitter at @thebingblog.

ILLUSTRATION BY RYAN INZANA

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Visit us at **synchronybank.com** or call 1-800-753-6592 to get started using promo code **FORT12H**.

[1] Annual Percentage Yield (APY) is accurate as of 10/15/15 and subject to change at any time without notice. A minimum of $2,000 is required to open a CD and must be deposited in a single transaction. A penalty may be imposed for early withdrawals. Fees may reduce earnings. After maturity, if you choose to roll over your CD, you will earn the base rate of interest in effect at that time. Visit synchronybank.com for current rates, terms and account requirements. Offer applies to personal accounts only.

[2] National Average APYs based on specific product types of top 50 U.S. banks (ranked by total deposits) provided by Informa Research Services, Inc. as of 9/1/15. CD Rates: Average APYs are based on certificate of deposit accounts of $25,000. Although the information provided by Informa Research Services, Inc. has been obtained from the various institutions, accuracy cannot be guaranteed.

† FDIC Insurance up to $250,000 per depositor, per insured bank, for each ownership category.

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